Corporate Survival and Managerial Experiences During the Great Depression

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Abstract
We study corporate performance during and after the Great Depression for all industrial firms on the NYSE. Our first goal is to identify the factors that contribute to business insolvency and valuation during the period 1928 to 1938. To this end, we examine factors such as debt policy, credit-worthiness, corporate governance, and investment. Our second goal is to determine whether experiences during the Depression had a lasting effect on corporate decisions in the 1940s.

We find that firms with more debt and lower bond ratings in 1928 had a greater probability of becoming financially distressed during the Great Depression. The value loss associated with high leverage for 'value' firms is very significant, while the effect for 'growth' firms is small. The probability of encountering distress during the Depression is also related to operating profits and firm size in the year prior to the occurrence of distress. We also find that companies with large boards, and boards dominated by insiders, are less likely to survive the Depression. Finally, we find that the Depression experience appears to have affected the preference to use debt, even after the economic environment improved: Firms that were highly levered during the Depression use relatively little debt in the 1940s. Moreover, this behavior appears to be individual-specific because the use of debt increases in the 1940s at companies for which the Depression-era company president retires or otherwise leaves the firm.

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The Great Depression caused significant economic, social and political turmoil and is arguably the most important economic event of the 20th Century. Bernanke (1995) says, "To understand the Great Depression is the Holy Grail of macroeconomics." While macroeconomists have long studied the Great Depression, to date there is little firm-by-firm analysis of this era. Bernstein (1987, p. 50) states that "the dearth of firm-specific evidence" has forced economists to rely on industry-wide data in an attempt to infer the actions of individual companies.

In this paper, we investigate whether firm characteristics had differential effects on corporate solvency and performance during the Great Depression era. We remove the need for inference based on industry-level data by directly examining firm-level data for all industrial firms on the NYSE from 1928 to 1938. To date, our paper is the most comprehensive examination of the Depression era at the level of the firm.[1] Note that we do not attempt to identify corporate behaviors that caused or contributed to the Depression. Instead, we assume that the Depression occurred exogenously and use this environment to study corporate solvency and valuation during a stressful period.

Studying corporations during the Great Depression contributes in several ways to our understanding of financial economics. First, studying the Depression is important in its own right, given the magnitude of the event. To understand whether a severe economic shock like the

[1]Several papers examine firm-by-firm data for parts of the 1930s, though none focus on corporate solvency or performance during the Depression. Holderness, Kroszner, and Sheehan (1999) use the first SEC-mandated declaration of stock ownership to compare management stock positions in 1935 to those in 1995 and find that stock ownership increased over these sixty years. Gordon (1936, 1938) examines the same SEC ownership data for a smaller set of firms. Hadlock and Lumer (1997) examine the rate of top management turnover and the sensitivity of management turnover to stock returns for a sample of firms from 1933 to 1941. Ely and Waymire (1999) use firm level accounting data to examine the relation between intangible assets in 1927 and pre-Depression stock prices for a sample of industrial firms. Christie and Nanda (1994) study the effects of the undistributed profits surcharge tax on dividend behavior in 1936 and 1937. Burch, Christie, and Nanda (2003) examine rights offerings during the 1930s and 1940s. Taussig and Baker (1925) use survey data to examine the corporation and its executives between 1904 and 1914. See footnote 10 for a description of Stigler and Freidland (1983).

Depression could occur again, one first needs to thoroughly understand the previous depression.[2] While macroeconomists have developed several theories to explain the Depression, to our knowledge no firm-level analysis has been performed. For example, Bernanke (1983) notes that the "pervasiveness of debtor insolvency" is a major aspect of the Depression that has not been studied adequately. We attempt to shed light on corporate insolvency during this era. While our analysis is at the level of the firm, it has implications at the macroeconomic level because, as Bernstein (1987; p. 50) notes, "it is decisions made at the microeconomic level of the firm that determine the overall performance of industries and indeed of the macroeconomy."

Second, there are several aspects of the Great Depression era that make it an ideal setting to study corporate performance. The Great Depression was generally a surprise, and therefore can to some degree be viewed as an exogenous shock to any particular company.[3] Moreover, the Great Depression represents a prolonged period of disequilibrium. Severe negative economic conditions can expose weaknesses in corporate form or operations that might be much harder to detect during normal or robust economic conditions, and the resulting cross-sectional variation in performance can enhance statistical identification of the key factors.

Third, examining the Depression helps solve, at least in part, the "peso problem" of economic research. The peso problem occurs in empirical analyses that do not include realizations of very severe negative events (because, of course, these events occur only rarely). Studying the

[2]This point is particularly interesting today given the parallels between the Roaring Twenties and depressed 1930s and the "new economy" boom of the 1990s and ensuing contraction. The 1920s was a period of significant technological advancement (Field, 2003), extreme investor confidence, and record numbers of stock and bond issuances, just like the 1990s. Stock market valuations in the 1920s were very high. After the crash, like today, there were cries of accounting irregularities, a movement to hold board directors legally liable for abysmal corporate performance, and a widespread feeling that corporate management had been able to operate too freely in the era preceding the Depression.

[3]With hindsight, the seeds of the Depression can be detected in 1920s macroeconomic data (Bernstein (1987)). Nonetheless, the Depression is generally considered to have been a surprise to most investors and corporations.

Depression provides information about the left tail of the distribution of possible outcomes, attenuating the peso problem. To the extent that results based on the Depression are consistent with those from research about the rest of the distribution, they reinforce our understanding of business performance in general. To the extent that results based on the left tail do not confirm results based on the rest of the distribution, they call into question the broad applicability of the previous results. Either way, analyzing the left tail provides out-of-sample insights to improve our overall understanding of financial economics.

Fourth, there are several aspects of our analyses that complement specific topics in the modern literature. For example, while numerous papers argue that firms balance the marginal costs and benefits of debt financing when choosing their optimal amount of debt, the evidence explicitly documenting the costs of debt is somewhat sparse and narrow. For example, Warner (1977) examines the ex post costs of debt among railroad companies. Andrade and Kaplan (1998) examine the ex post costs of debt among 31 highly levered firms and Weiss (1990) studies 37 firms that declared bankruptcy in the early 1980s. To the extent that they can be generalized, these papers indicate that the direct costs of debt are modest. By examining a much broader sample of firms, we gain a better understanding of the costs of distress (both financial and economic). There is also an argument based on anecdotes that high-debt companies experienced first-hand about the costs of debt during the Depression,[4] and therefore operated with little debt in the ensuing decades (e.g., Miller (1977)) – though no empirical evidence has been provided to validate this claim.

Another way that our paper complements the modern literature is that we investigate whether corporate governance (namely, the size and composition of the board of directors) affects corporate

[4] For example, Sewell Avery, the President of Montgomery Ward, is known to have kept his firm debt-free and cash-rich because he feared another depression. Similarly George Eastman of Eastman Kodak is reputed to have stayed away from debt because he feared the ills of leverage.

performance. Some papers find that valuation decreases with board size (Yermack (1996)) and increases with the strength of corporate governance (Gompers, Ishii, and Metrick (2003)). The Depression is an interesting time to examine governance for several reasons. It is widely held that managers had much more freedom in their actions in the 1920s and 1930s than they do today, which potentially sets the stage for severe agency problems (as posited by Berle and Means (1932)). For example, insider trading was legal during the 1920s, corporate reporting was in its infancy, lending conditions were loose, there were few informational specialists analogous to today's analysts to provide an objective interpretation of corporate performance (Banerjee and Eckard (2001)), and there was little threat of outside takeover. Moreover, shareholder expropriation often increases when return on investment and therefore the opportunity cost of funds is low (Johnson et al. (2000)), as it was during the 1930s. Finally, as pointed out by Lemmon and Lins (2003) with respect to the Asian financial crisis of the 1990s, small imperfections in corporate governance can lead to large problems when things go haywire, as they did during the Depression, allowing one to identify the imperfections. We investigate whether boards of directors affect corporate performance, and infer from this what types of boards were most effective in overseeing management during a severe negative economic shock.

Our results indicate that high leverage significantly increases the probability of becoming distressed during the Great Depression. The results also indicate that credit ratings were good predictors of leverage quality in that firms with investment grade debt were significantly less likely to encounter distress. We also find that high leverage affected 'value' firms significantly, with high leverage greatly retarding the recovery from the Depresson (about a 40% difference in valuation for

high debt value firms relative to low debt value firms). In contrast, debt led to less than 10% incremental value loss in 'growth' firms.

We extend the debt analysis by analyzing whether firms "learned" to use less debt based on their experiences during the Depression. We find that the mean nominal debt ratio decreased from 12% before the Depression to about 8% in 1938. While the mean debt ratio rebounded to about 10% by 1948, firms that had high-debt during the Depression maintained relatively low leverage. Interestingly, the increased use of debt in the 1940s was largest at firms for which the company president had left the firm. This evidence is consistent with professional (and perhaps personal) experiences during the Depression leading to debt conservatism after. It is also consistent with evidence in Bertrand and Schoar (2003) that manager-specific effects explain a significant portion of corporate investment and financial decisions.

The governance results show that firms that had smaller boards of directors with fewer insiders had a lower probability of becoming distressed during the Depression. This complements Yermack's board size results (1996) and suggests that, on average, smaller boards with fewer insiders are more efficient at monitoring management during abysmal economic times. Value firms suffered more than growth firms on account of larger boards, perhaps due to greater agency costs in value firms. Finally, our results indicate that firms that had substantial pre-Depression investment had more problems during the downturn.

It is important to interpret our results in light of possible effects from endogeneity. For example, in general it is possible that finding that high debt and inefficient boards lead to greater distress could be driven by reverse causality (i.e., firms borrow more in response to the initial symptoms of distress). However, in our main analysis, we examine whether firm characteristics in

1928 affect the probability of distress from 1930 to 1938; therefore, the time sequence of events makes it impossible for distress to occur first, followed by levering up (unless distress started before 1928 but we did not detect it until the 1930s).

In some cases, it is also possible that the actions of corporations contribute to the occurrence of the event. Like Chevalier and Scharfstein (1996), Zingales (1998) and others who study recessions, we argue that the nature of the event that we study makes this unlikely. An advantage of examining a largely unanticipated event (in both timing and severity), is that it is unlikely that managers could anticipate the outcome of their actions. The nature of the Depression is such that it is very unlikely that the debt or governance policy at a given firm contributed to the occurrence of the Depression itself. Therefore, the Depression can be thought of as an exogenous shock in terms of the effect of a given firm's choices on the probability of distress.

A related issue is that unobservable factors could drive both distress and characteristics such as board size and composition. For example, a self-interested CEO could make decisions that lead to distress and also appoint a board of inside cronies who will not monitor his actions. Insider boards would then be correlated with but not cause distress. We are not able to eliminate the possibility that unobservable variables affect our analyses. However, we can report that we do not find obvious evidence that unobservables drive our results. First, if an unobserved variable causes both governance and performance, one might expect to find that firms that perform relatively poorly in 1928 (because the CEO is self-interested) appoint large or insider-dominated boards. However, neither board size nor percentage insiders on the board is negatively correlated with profits in 1928. Moreover, we find that distress during the Depression is correlated with pre-Depression board size but not with pre-Depression profitability (and also that, holding profitability constant, board size is

still significantly related to distress). Again, if self-interested CEOs drive profitability as well as other characteristics, one would expect pre-Depression profitability to affect Depression-era distress and/or reduce the significance of board size.

Our conditional results vary in ways that are consistent with economic theory. For example, we find that large boards are detrimental to value firms (where agency issues are expected to be large) but helpful to growth firms (where extra expert directors might help growing firms navigate tumultuous economic times). While it is possible that unobervables also cause these conditional results, the story behind such a scenario becomes more involved. Finally, during the 1930s there was public outcry that boards should be made smaller and have more outside representation. The results discussed in this and the previous paragraph are not consistent with unobservables causing our main findings. However, we acknowledge that neither do they eliminate the possibility that unobservables affect our analysis, and therefore our results should be interpreted accordingly.

The rest of the paper is organized as follows. Section I provides background about the Great Depression. Section II develops our hypotheses. Section III describes the data and Section IV presents results about the probability that a firm encounters distress during the Depression. Section V quantifies the value loss attributable to higher leverage and larger board size during the Depression and Section VI examines whether managerial experiences during the Depression affect post-Depression decisions. Section VII concludes.

II. The Great Depression

The Great Depression followed a decade of progress and prosperity that many expected to continue. In 1928, Herbert Hoover, in his acceptance speech for the Republican Party Presidential nomination,

said, “We in America today are nearer to the final triumph over poverty than ever before in the history of any land. The poor house is vanishing from among us.” This optimism was shared by many. Noted Yale economist Irving Fisher stated confidently, “the nation is marching along a permanently high plateau of prosperity.” Fisher was quoted in the New York Times on October 16, 1929 as saying that “... increased earnings justify the stock price rise.” Again on October 22, 1929, just one week before the stock market crash, he was quoted in the Times as saying that “…quotations have not caught up with real values as yet.”

The Great Depression was a period of immense social and economic stress. Gross National Product, employment, and prices all declined sharply from 1929 to 1933, the trough of the Depression (see Figure 1). The country’s real GNP declined from $190.9 billion in 1928 to $141.5 billion in 1933. Unemployment increased from 4.2% in 1928 to over 25% in 1933. Following the trough there was an uneven recovery. Aggregate GNP did not reach 1928 levels again until 1938. The stock market declined dramatically from 1929 to 1932 (see Figure 2). The aggregate market value of common stock on the NYSE declined from about $60 billion in December 1928 to about $20 billion in December 1932. The Dow Jones Industrial Average (DJIA) lost four-fifths of its value between 1928 and 1932, declining from 300 in December 1928 to 59.93 in December 1932. Similarly, the Moody’s Commodity Index, which had a value of 223.5 in December 1928, measured only 79.8 in December 1932. Trading volume on the NYSE dropped from 1.1 billion shares in 1929 to less than 500 million shares in 1932. Finally, broker loans, which totaled over $6.4 billion in 1928, declined to about $430 million by 1932.

The Great Depression led to significant contraction in the corporate sector. Figure 3 shows that new corporate bond (Panel A) and equity (Panel B) issuances fell significantly after 1929. There

was a significant reduction in manufacturing production and a significant increase in business failures. Similarly, Panel A of Figure 4 shows that the percentage of firms with positive net income declined from about 61% in 1928 to about 18% in 1932; Panel B shows that the average nominal dividend per share declined from $2.66 in 1929 to $0.78 in 1933. Panel C shows that by 1938, 25% of the firms in our sample that became financially distressed (i.e., liquidation, restructuring with worthless stock, or declaring bankruptcy; the sample is described in Section III).

Macroeconomists offer several theories of the Great Depression, some monetary and some nonmonetary. One monetary theory argues that the 1928 central bank-instituted contraction of the money supply may have precipitated the market crash and helped kick-start the Depression. There was also excessive speculation in the Roaring 20s, and loose credit conditions, which contributed to unstable banking markets. Bernanke (1995) argues persuasively that countries struggled to recover from the Depression while still on the gold standard, in part because tying reserves to gold led to money contraction, which in turn led to deflation, rising real wages, and rising unemployment. The U.S. left the gold standard in 1933, approximately when the country began to recover from the trough. The 1929-1932 financial crisis and resulting wealth erosion ruined business and investor confidence, which deepened and prolonged the contraction. Reduced confidence contributed to lower consumer demand, which in turn left the economy with excess capacity and minimal business investment.

There are also nonmonetary theories of the Depression. One theory argues that income disparity increased significantly during the 1920s, which led to a reduction in the average propensity to consume, which in turn led to a misalignment between real production and the consumption capacity of the economy. Ultimately, demand for goods diminished and there was substantial excess

production capacity. Others note that with the untimely occurrence of a long drought, crops failed in the agricultural economies in the late 1920s, and the resulting reduction in demand for products from industrial economies exacerbated the problem world-wide. This, coupled with the increase in international trade barriers, provided the U.S. economy with little export potential for its production, and hence, heightened the severity of the Depression. Finally, these problems were magnified in the U.S. because the rapid expansion into the country's western territories was largely complete by the late 1920s, so another source of demand for heavy industry (like railroads) simultaneously dried up. Bernstein (1987) argues that most heavy and durable industries (e.g., iron and steel; building materials) continued to struggle through the second half of the 30s, while consumer and "lighter" products like foodstuffs and chemicals (e.g., rayon) recovered more rapidly.

The collapse of the corporate and financial sectors was followed by calls for reforms in general, and of the board of directors in particular.[5] In the early 1930s William O. Douglass, Yale professor of corporate law, future chairman of the SEC, and future Supreme Court Justice, called for boards comprised of proportionally more outsiders (New York Times, April 3, 1933). There was also a reform effort to "reduce the size of boards" (as noted by Richard C. Patterson, Jr., Assistant Secretary of Commerce, in the New York Times Magazine, January 21, 1940). Patterson also urged that corporations self-regulate by reforming their boards, in response to a proposal to appoint governmental outsiders to boards (a proposal that was never enacted). There is also evidence that some boards were active in replacing management at underperforming companies.[6] One can presume

[5] As early as 1874 there is evidence that outside directors found it difficult to manage a company in the same way that employees of the firm could (e.g., Report of the Investigating Committee of the Pennsylvania Railroad Company). Reform efforts in the next 50 years concentrated on efforts to allow directors to better manage the firm, which differs from the modern emphasis on boards monitoring the actions of others (Werner (1977)).

[6] For example, in 1933 the board of directors of the Bush Terminal Company sent a letter to stockholders "explaining to the stockholders the reasons that the board had thought it necessary to supplant (then president) Mr. Bush in the management of the company to protect the interests of the stockholders" (New York Times, February 28, 1933, page

that efforts to reduce board size and appoint outsiders emanated from observations that, at least in some cases, small outsider-dominated boards had governed efficiently during the early 1930s. We test below whether this held true across the industrial companies that were listed on the NYSE during the decade starting in 1928.

II. Theory and Hypotheses

In this section we develop hypotheses about factors that potentially contributed to corporate distress during the 1930s. Given the firm-by-firm nature of our data, we focus on microeconomic and corporate finance explanations of distress; however, we also attempt to link to (and control for) several phenomenon from the macroeconomic literature. We group these hypotheses by leverage, internal governance, macroeconomic-related explanations and several other factors.

A. Leverage

Numerous papers argue that there is a trade-off between the benefits and costs of debt. The benefits include interest tax deductions (e.g., Scott (1976)) and disciplining managers of low-growth firms that have free cash flows (by committing the firm to distribute the free cash flows as interest payments (Jensen (1986)). The tax benefits of debt were small during the Depression era because corporate tax rates were low. Therefore, the benefits might have consisted primarily of monitoring and otherwise helping to reduce managerial entrenchment (Berger, Ofek, and Yermack (1997)) and mitigate agency problems.[7] The costs of debt include underinvestment due to bypassing positive

27).

[7] Safieddine and Titman (1999) provide evidence that among firms that are subject to takeover attempts that fail, the firms that increase their leverage the most act in the shareholders interest after the termination of the takeover, and have the highest probability of remaining independent. The authors argue that leverage commits managers to making the improvements that a potential raider would have made.

NPV investments (Myers (1977)) and costs of distress that occur when a firm can not meet its fixed obligations.

There can be important interactions between product markets and capital structure. Several papers argue that high leverage can lead to reduced output (e.g., Chevalier (1995b) and Phillips (1995)). The interaction between product markets and capital structure can vary with the business cycle. Opler and Titman (1994) find that during an economic downturn highly levered firms lose substantial market share to their more conservatively financed competitors. This could occur because of "customer driven," "competitor driven," or "manager driven" factors. The manager driven decline may be advantageous to shareholders because it posits that the managers of levered firms are quicker to efficiently reorganize in response to a negative shock. This would imply that leverage may be beneficial during an economic contraction because it forces managers to quickly take corrective action. However, customer driven and competitor driven declines in sales are costly to shareholders. The customer driven decline is costly because it indicates that customers avoid highly levered firms in favor of their more conservatively financed competitors. Similarly, the competitor driven decline in sales is costly because it indicates that less levered firms are able to compete more aggressively and capture market share from highly levered firms during a period of economic stress. Opler and Titman (1994) use data from 1972 to 1991 and find that the observed decline in market share is at least partially customer driven and competitor driven rather than manager driven, implying that leverage is bad during a negative economic shock.[8]

[8]Other papers find similar negative relations between indebtedness and corporate performance. Campello and Fluck (2003) find that when competitors have less leverage, highly indebted firms lose market share during an early 1990's recession, which they link to consumers being hesitant to buy products from distressed firms. Chevalier (1995a) finds that LBO supermarkets are preyed upon in the 1980s by low-debt competitors, who reduce prices below a level that LBO firms can sustain and continue still make debt payments. She finds that LBO supermarkets are more likely to exit the local market under these circumstances. Similarly, Khanna and Tice (2003) examine pricing and exit among discount department stores during 1982-1995. They find that prices fall during recessions in cities where there are firms with both high and low debt (consistent with predatory pricing), and that the probability that a firm

Bernanke (1983) states that outstanding corporate bonds and notes nearly doubled in the 1920s, which suggests that the effects of debt might be particularly noticeable during the 1930s. Bernanke (1995) develops an interesting hypothesis about the negative effects of debt during the Depression. During a deflationary period, the real obligation of fixed debt payments becomes larger in real terms. Traditional macroeconomics suggests that this should be a neutral event for the overall economy if wealth is simply transferred from debtors to creditors. Bernanke points out that unexpected wealth redistribution away from debtors reduces collateral and therefore reduces the amount of capital that they can borrow, raising the possibility that debtors might have difficulty completing existing or initiating new positive NPV projects. Moreover, some firms could end up selling assets at depressed prices in order to make debt payments, which might exacerbate the negative effects of debt at distressed firms (and also reinforce the downward spiral in prices).

The first leverage null hypothesis is that the level of indebtedness does not affect the probability that a firm will encounter distress during the Depression. One alternative hypothesis is that debt provides monitoring, reduces entrenchment, and/or provides incentive to efficiently restructure operations when faced with a severe negative economic shock, and therefore reduces the likelihood or severity of distress. Another alternative is that having more debt increases the likelihood and expected costs of distress.[9]

Debt can interact with investment opportunities in interesting ways. Myers (1977) emphasizes that a troubled firm with a large amount of existing debt might not undertake projects with moderate but positive NPV because the benefits might accrue to existing bondholders, rather

exits the industry in response to these reduced prices increases with debt. Finally, Zingales (1998) finds that, following deregulation of the trucking industry in the early 1980s, the probability that a firm exits the trucking industry increases with its level of indebtedness.

[9] This would be consistent with the logic of some modern corporations that they use little debt because if a severe negative event were to occur, the firm would be faced with dire circumstances (Graham (2000)).

than to stockholders. This problem is heightened for growth firms. It seems plausible that the effects of debt-deflation (described two paragraphs above) could also be heightened in growth firms because they have fewer assets to sell in an attempt to fulfill their fixed debt obligations. The second leverage null hypothesis is that growth opportunities are unrelated to the costs or probability of encountering distress. The alternative is that firms with growth opportunities suffer the largest costs of debt during the Depression.

Finally, we test whether rating agencies provided a useful service during the early part of the century. Our null hypothesis is that bond ratings provide no information beyond what is contained in publicly available information. Under the null, after controlling for firm characteristics, we expect that debt ratings will not be significantly related to the probability or severity of distress. Under the alternative that rating agencies provide useful information above and beyond that found in accounting information, we expect a negative relation between rating quality and the probability of distress.

B. Governance

Berle and Means (1932) conclude that the corporate form of organization, and the associated separation of ownership and control, leads to agency problems between a firm's managers and stockholders. They argue that corporate managers own very little stock, and therefore that the interests of managers diverge from the interests of stockholders. Berle and Means contend that the largest shareholders typically do not own sufficient stock to have much influence on management. The Berle and Means premise is that managers could pretty much do as they pleased, given the market power of large corporations and ineffectual oversight by the owners of the firm.[10] More than

[10]Berle and Means' (1932) thesis was accepted at the time with very little empirical proof. Stigler and Friedland (1983) provide some of the first rigorous tests of their claims. Examining approximately 100 large firms, Stigler and Friedland find no relation between executive pay and management control of the firm. They also find no evidence

70 years later, Berle and Means arguments are still influential in the agency cost literature. (See Shleifer and Vishny (1997) for a review of the modern literature.)

We focus on the 'internal governance' aspect of corporate control. We investigate whether poor internal governance increases the probability of financial distress. We measure the efficiency of internal governance using two variables: board size and board composition. (We do not examine the effects of management stock ownership because these data were not available for most of our sample period.)

Several studies argue that small boards are more effective than large boards. Lipton and Lorsch (1992) and Jensen (1993) advocate smaller boards based on productivity considerations. Jensen (1993) states "…as groups increase in size they become less effective because the coordination and process problems overwhelm the advantages from having more people to draw on." Yermack (1996) shows that firms with smaller boards have higher market valuations and exhibit more favorable financial ratios. Our null hypothesis is that board size should have no effect on the likelihood or severity of distress. The alternative hypothesis is that if smaller boards are more effective, we should observe a significant positive correlation between board size and the probability of distress.

Corporate performance can also be affected by board composition, namely, the fraction of inside directors on the board. Baysinger and Butler (1985) find that boards composed of a larger proportion of outside directors perform better. Rosenstein and Wyatt (1990) find positive investor reaction to the appointment of an outside director. In general, extant research indicates that boards

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that management control led to reduced profitability during most of the 1930s (the exception being weak evidence that management control led to lower profitability in 1937/1938). Therefore, the statistical evidence in favor of Berle and Means' thesis, based on 1930s data, is weak or nonexistent. We critically examine the implications of Berle and Means, based on data that existed at the time their book was published but we examine a much larger sample than Stigler and Friedland (1983).

dominated by outside directors are more likely to act in shareholders' interest. However, in terms of whether these actions lead to better performance, Hermalin and Weisbach (1991) find no relation between the fraction of outside directors and firm performance. Our null hypothesis is that board composition has no effect on the occurrence or severity of financial distress. The alternative hypothesis is that if boards with more insider directors are less effective, then we should observe a positive relation between the percentage of inside directors and the probability of distress.

Denis (2001) notes that the need for and effectiveness of board monitoring can vary with investment opportunities. She conjectures that firms with plentiful investment opportunities might need insiders on the board because of their expertise in the industry. In contrast, mature firms (with reliable cash flow but limited growth opportunities) need boards with outside monitors to ensure that profits are not squandered. Therefore, we include variables that interact a measure of investment opportunities with 1) board composition, and 2) board size.

C. Macroecomic Factors (Industry Composition; Gold Standard)

Several factors that can lead to corporate distress are closely linked to the macroeconomic literature. Bernstein (1987) argues that the Depression was severe and long-lasting because the U.S. economy was in the midst of a major transition at the time of the financial market meltdown. There was a growing middle class at the time, with a growing taste for consumer goods like refrigeration, canned foods, cigarettes, and automobiles with frills. At the same time, the old, heavy industries that had prospered for decades, as the country expanded westward and built the infrastructure for automobile and rail travel, began to slow. In an ideal scenario, gains from the new consumer goods industries would grow sufficiently (in production and employment) to offset declines in heavy industries. In the 1930s, however, the nondurable and consumer goods industries were in their infancy. Any

increase in employment or production that these industries experienced during the 1930s was not sufficient to overcome severe problems in the heavy, durable industries.

To test the Bernstein (1987) hypothesis that the slowdown was mainly for the old industries and that there was a transition towards newer consumer industries, we include a dummy variable that takes on the value 0 if a firm manufactured consumer non-durable goods and 1 otherwise. The null hypothesis is that there is no significant difference in the probabilities of distress among 'old' and 'new' industries. The alternate hypothesis is that firms that produced durables are more likely to become distressed.

Bernanke (1995) notes that many countries did not recover from the Depression until they delinked their currency from gold. For example, the U.S. recovery from the trough of the Depression began in 1933, which coincided with the abandonment of the gold standard. We attempt to control for this monetary effect using a dummy variable, as described in Section III.

D. Age

Jovanovic and Rousseau (2000) study how technological change affects the economy and the aggregate stock market. They find significant 'vintage effects' in stock prices that are especially strong in the 1920s, which they interpret as indicating that firms that formed during the 1920s performed better than firms that were formed during other decades. They argue that this occurred because there were numerous innovations during the 'Roaring 20s' that favored firms of that decade in terms of new technology, management techniques and manufacturing methods, which might allow 1920s entrants to be relatively well suited to handle the 1930s. Moreover, young firms in the 1920s are more likely to produce nondurable goods, and as argued in the previous section, they might have fared better during the Depression. In contrast, the 'liability of newness' hypothesis of Stinchcombe

(1965) argues that younger firms are more prone to becoming distressed than older, more mature and better established firms. We include a variable to determine the effect of firm age on the probability of distress during the Depression.

E. Liquidity

Hunter (1982) finds that the largest firms were able to build up liquid assets (i.e., cash and government securities) during the 1930s, even in the face of declining revenues, while small firms were not able to accumulate liquidity. Hunter argues that extra liquidity helped firms survive during the 1930s, when credit was hard to come by. We include a liquidity variable in our analysis. The null hypothesis is that liquidity does not affect the probability of financial distress. The alternative hypothesis is that illiquid firms have a higher probability of encountering distress.

F. Size, Profitability, Investments, and Volatility

We control for firm size, in part because Bernanke (1983) summarizes research that indicates that small firms were less profitable and encountered distress more often than large firms during the 1930s. Moreover, if the stock market can anticipate distress and discount stock prices accordingly, we expect (negative) returns to be a good predictor of future distress. Shumway (2001) finds this variable to be a significant predictor of bankruptcy during the 1980s. Thus, we expect to find a negative relation between firm size and the occurrence of distress.

We expect that firms with higher operating profits in 1928 to have lower probabilities of distress if their profitability enables them to withstand negative economic shocks. Thus, we expect a negative relation between operating profit and the probability and severity of distress. We also control for investment of the firm. Finally, we expect that firms with volatile cash flows will be more likely to encounter distress.

III. Data and Variable Definitions

A. Data

We hand collect a panel of firm-level data for every unregulated, nonfinancial firm on CRSP, for the period 1926 to 1938. Given that our sample includes all CRSP firms, this implies that it includes all public companies listed the NYSE. For one part of our analysis, we also collect information about debt usage in 1948 for these same firms.

In much of the paper, we focus on industrial firms that existed in 1928. There are 657 firms on CRSP in 1928. Of these, 34 firms are classified as utilities, 68 as railroads, and 34 as finance firms. After deleting these firms from the sample, we are left with 521 industrial firms. Of these, 25 firms had only a partial year of data in 1928 or 1929. We exclude these firms because we require that the firm be listed as of January 1928 and that the firm not be delisted/distressed at least until December 1929. We exclude firms that were delisted before December 1929 because it is possible that these firms were already distressed prior to the inception of the Depression. After purging the sample of these firms, we have a sample of 496 firms. Our final requirement is that the firms have at least one year of accounting information prior to fiscal year 1928. This results in a final sample of 446 industrial companies.

We collect accounting data from Moody's Investment Manual for Industrial Securities. Moody's provides a brief history of the firm, the balance sheet, the profit and loss statement, a list of the officers and directors, the credit ratings for the firm's securities, and other general information. We gather this information for the panel of firms in our sample, during the years 1926 to 1938.

We use several data sources to identify firms that became financially distressed. The first source for identifying distress is the *Capital Changes Reporter*. This database lists the changes in the capital of a firm, from the date of incorporation until dissolution. If a firm filed for bankruptcy, was liquidated, or undertook a court-ordered reorganization or recapitalization, the information is available in the *Capital Changes Reporter*, along with the date of occurrence. The database also provides a stock price on the date that the significant capital change took place. Further, the database classifies common equity as 'worthless' when there are no buyers for the stock. In the event of a merger, the database also lists whether the merger was part of a reorganization. Moody's Manual provides a second source for identifying whether and when a firm becomes distressed. Moody's gives detailed reports of events like default, bankruptcy, liquidation, and reorganization. Finally, we also use CRSP delisting codes to identify firms that delisted due to liquidation. Thus, we use three different sources to identify distressed firms, and in a majority of cases, the occurrence of distress is indicated in more than one source. However, we only require that a firm be identified as distressed in one source to be classified as distressed in our analysis. (The results reported below are robust to requiring that distress be identified in at least two of the three sources.)

We search the above databases for any indication of distress during the period January 1930 to December 1938. We classify a firm as being distressed if at least one of the following occurs: the firm files for bankruptcy, liquidates, undertakes a court-ordered reorganization, recapitalizes when its shares are classified as 'worthless,' or is taken over as a result of one or more of the above problems.

For much of our analysis, we perform logistic regressions using DISTRESS as the dependent variable, where DISTRESS is a binary variable. In the first part of the analysis, DISTRESS equals

one if the firm becomes financially distressed at any point during the Depression (i.e., during 1930 to 1938) and equals zero otherwise. In the second part of the analysis, DISTRESS equals one if a firm becomes distressed in the current year and equals zero otherwise.

The remainder of this section defines the explanatory variables. We measure *leverage* as the fraction of total debt to book value of assets. Total debt includes all forms of debt on the liability side of the balance sheet. We use book leverage rather than market leverage (i.e., book debt divided by the market value of the firm) because of the enormous fluctuations in market equity during the 1930s.

We measure internal corporate governance efficiency using two variables: board size and inside directors. *Board Size* is measured as the log of the total number of directors on the board. (Moody's lists the name of every director and officer of the firm.) An inside director is defined as a board member who is also an officer of the firm. Thus, *Inside Directors* is the fraction of directors who are also listed as officers of the firm.

As a measure of a firm's ability to service its debt and its overall quality, we use the *bond rating* assigned by Moody's Investment Service for the year 1928. We assign a value of 9 for a AAA rating, 8 for AA, 7 for A, 6 for BBB, 5 for BB, 4 for B, 3 for CCC, 2 for CC, and a 1 for a C rating (the lowest 1928 rating for our sample firms). In the late 1920s, Moody's was more likely to provide a rating for common and preferred stock than it was for debt. In fact, we find a common stock rating for nearly every firm in our sample but a debt rating for only about half of the firms (primarily the firms that had debt in 1928). For the companies that had both debt and common stock ratings, in almost every case bonds were rated two levels higher than common stock, and preferred stock was generally rated between common equity and debt. For the firms with unrated debt in 1928, we assign

a bond rating that is two levels higher than the common stock rating (e.g., we assign a rating of 7 to unrated debt if the common stock is rated 5 by Moody's). We use the log of the rating in our analysis, which imposes a nonlinear benefit to improved ratings. As a robustness check, we repeat the analysis using the numerical value of the rating, rather than its logarithm.

In an attempt to control for macroeconomic factors, we include a variable *DUR*, which takes on the value 1 if the firm produces 'old economy' heavy, durable products (one-digit SIC codes 1, 3, and 4). A value of 0 indicates that the firm produces consumer nondurable products. In some specifications, we also include industry dummies based on 1-digit SIC codes. However, only two of the 1-digit industry dummy variables are significant, and including these two does not significantly affect the coefficients for the other variables, so we drop the industry dummies in the reported results. (We perform an unreported analysis dummying the 42 industries defined by Fama and French (1997) but none of the dummies are significant.) We also include a dummy variable that has a value of one for 1933 and later to account for the years for which the U.S. was no longer on the gold standard.

Size, as in Shumway's (2001) analysis of the probability of distress, is measured as the log of the market capitalization of the firm in a given year, divided by total market capitalization of all CRSP firms in that year. As a robustness check, we also use the log of total assets as a measure of firm size and generally find similar results.

Operating profit measures return on assets and is defined as earnings before interest and tax (EBIT) divided by total assets. Note that EBIT is not directly affected by the level of indebtedness of the firm. *Age* is the log of the number of years since the firm initially formed (as listed in Commerce Clearing House. Note that this date often predates the year of incorporation, as reported

in Moody's). We include capital investment as a control variable; *investment* is measured as the change in dollar value of fixed assets from the previous year.

The *market to book ratio*, defined as the ratio of the market value of the firm's equity to book equity, is used to measure growth opportunities. *Tobin's q*, defined as the ratio of the market value of the firm's assets to book assets, is used to measure market valuation. We also include the standard deviation of the firm's monthly stock price during the previous year as a proxy for cash flow *volatility*. Finally, we measure liquidity as the ratio of the firm's cash, inventory, and receivables to total assets, which we call *current assets* in the tables.

B. Summary Statistics

Table 1, Panel A provides some summary statistics for 1928. The mean (median) operating profit for 1928 was 8.7% (7.8%) of total assets. (Though not in the table, this is a moderate improvement over the 1927 profits of 8.1% (7.5%)). The mean (median) debt ratio of 11.7% (6.8%) is lower than the debt ratios of recent years. Though not in the table, the mean market leverage was about 17%. Size varies widely for the firms in our sample. The smallest firm had total assets of $395,000, while the largest firm (U.S. Steel) had total assets of $2.4 billion (in 1928 dollars). There is also wide dispersion in age, with the oldest firm in the sample being 168 years old, and the youngest firm being just one year old in 1928. The median debt rating is 6 (BBB) in 1928. Panel B provides correlations for some key variables.

In Section IV.B we examine annual data through 1938. Table 2 provides summary statistics for some key years and also for the full sample period 1926 to 1938. It can be seen from the table that median profitability, which was about 8% in 1928, dropped to -1% by 1932. The recovery

started in 1933, when profitability rose to 2.0%. Profits increased to 4.0% in 1938. Similarly, book leverage dropped from a mean of 12% in 1928 to 10% in 1932, and even further to 8% in 1938. Median nominal assets declined from $24.4 million to $20.3 million in 1933, after which assets increased to $21.8 million in 1938.

IV. What Caused Corporate Distress During the Depression?

In Section A, we perform a logistic regression to determine whether pre-Depression firm and industry characteristics predict distress during the Depression. To accomplish this, we estimate a model using data from 1928 to define the explanatory variables. We use 1928 data because it was the last full year before the onset of the Depression. The values of the explanatory variables should therefore not be endogenously affected by the onset of the Depression.

We track the sample of firms until the end of 1938, to determine whether a firm became distressed at any point during this period. We examine 1938 because, although the Depression bottomed out in 1932/1933, the economy did not reach its 1928 level again until a decade later.

In Section B, we examine a panel of annual data (1929 to 1938) to determine which characteristics predict distress in the current year, conditional on the firm not being distressed in the previous year. Thus, we use a model similar to a hazard model, and we implement this as a conditional logistic regression. Taking the two analyses together, we gain a better understanding of which pre-Depression characteristics predict financial distress during the Depression, and how a firm progressed into becoming financially distressed during the decade.

A. Pre-Depression Characteristics as Predictors of Financial Distress During the Depression

In this section, we analyze logistic regressions to determine which pre-Depression variables predict distress during the Depression. The estimated coefficients for many of the variables have the expected sign, though not all are significant (see Table 3). We find that pre-Depression leverage is a positive and significant predictor of a firm experiencing distress during the Depression.[11] This is consistent with the fixed obligation of debt payments constraining firms during the Depression and leading to distress.[12] The debt coefficient is not consistent with pre-Depression monitoring by debtholders leading to improved performance during the economic crisis. This result is consistent with the implications of Opler and Titman (1994) that the overall effect of leverage on shareholder wealth is negative during a period of economic distress, and therefore is consistent with their competitor or customer driven hypotheses.

In terms of economic significance, for the mean firm, an increase in leverage by one standard deviation (from a debt ratio of about 11% to a debt ratio of about 24%) increases the probability of distress by 60% (from about 23% to about 37%, based on coefficients in column (3)). This large increase in the probability of distress provides strong evidence that debt can be costly following a negative economic shock. We further quantify the cost of debt in Section V.

The estimated coefficient on the debt rating is negative; therefore, credit ratings are significant predictors of distress during the Depression. As a robustness check we repeat the analysis using the linear rating variable, rather than the log of the ratings. The result holds for both cases, and indicates that debt ratings provide information beyond that contained in the other variables included

[11]This result holds when industry dummy variables are included in the specification and also when the debt variable is measured net of the mean debt for a given firm's 2-digit SIC code industry. Therefore, the debt result does not appear to be driven by underlying industry effects.

[12]In a specification not shown in the table, the estimated coefficient on a variable that separately identifies bank debt (i.e., bank debt explicitly listed in balance sheet or debt that is not rated by Moody's) is negative and insignificant.

in the regression.[13] The pre-Depression median credit rating of 6 (BBB) indicates that most firms were considered investment grade. For the mean firm, an increase in rating by one notch (e.g., an increase from BBB to A) decreases the probability of distress by 35% (from about 23% to about 15%).

The estimated coefficients for board size and fraction of inside directors are both positive and significant. The result that the probability of distress increases with board size is consistent with Lipton and Lorsch (1992), Jensen (1993), and Yermack (1996). These authors conclude that board efficiency decreases as the board grows. The result that the probability of distress increases as the fraction of insiders on the board increases is consistent with the implications of Baysinger and Butler (1985) that board composition affects firm performance and that boards composed of larger proportion of outside directors are better monitors than insider dominated boards. These results are also consistent with the implication in Berle and Means that problems due to the separation of ownership and control are heightened when control over management is small.[14]

The mean board in our sample contains 11 members.[15] An increase in board size by 1 member for the mean firm increases the probability of distress by one-tenth (from 23% to 25%). The

[13]In unreported analysis, the credit rating variable is still a significant predictor of distress when fixed assets divided by total assets (which is itself significant) and interest coverage (which is itself not significant) are added to the specification.

[14]In the introduction, we mention that these results should be interpreted considering possible effects of endogeneity. While the nature of our experiment makes it unlikely that reverse causality explains the results, or that corporate governance causes the Depression, we can not eliminate the possibility that an unobserved characteristic drives both board characteristics and distress. If this were true, one should interpret the coefficients as correlations rather than as indications of causality.

[15]This is similar to modern board size. Yermack (1996) uses a panel of large firms (drawn from Forbes magazine) and finds the average board size for the sample to be 12.25, with a median of 12. The IRRC finds that the average board size for an S&P500 company is 12. (Source: Impartial Research for Shareholders and Corporates Worldwide press release, January 10, 2000.)

mean percentage of insiders on the board is 39.7%. An increase in the fraction of insiders from 39.7% to 50.0% increases the probability of distress by about one-fourth (from 23% to 28%).

Taken together, our results are consistent with the board of directors having some ability to oversee and possibly reign in the actions of corporate executives. This implication is consistent with analysis of the 1980s and 1990s (for a review of the literature see Denis (2001)). The fact that our analysis is conducted during a period of extreme economic duress, great freedom of executive action, and many years ago, makes the confirmation of modern analysis somewhat surprising. At the same time, our confirming of the modern results lends credibility to those results.

The coefficient on the durable goods indicator is positive, consistent with Bernstein's (1987) hypothesis that newer firms that made consumer nondurable products faired relatively well during the Depression. However, the coefficient is not statistically significant.[16] In unreported analysis we replace the durable goods indicator with industry dummies but these coefficients are not statistically significant.

The coefficients on age, size, and profitability indicate that firms that were young, small, or less profitable in 1928 were more likely to encounter distress during the Depression, though none of the coefficients are statistically significant. The same is true for firms that experienced low stock returns in 1928. The coefficient on investment is positive and significant, indicating that companies that invested relatively heavily in 1928 fared relatively poorly during the Depression.

We conclude this section by examining three variables that interact a measure of investment opportunities (i.e., M/B) with other key variables (see columns 4 through 8 of Table 3). The

[16]The positive durable coefficient is also consistent with the argument by Campello and Fluck (2003) that consumers of durable goods face high switching costs and therefore durable goods industries suffer during a downturn. However, in an unreported regression we find that the interaction of debt and the durable goods dummy to be negative and insignificant. A positive coefficient would support the implication in Campello and Fluck that consumers particularly stay away from the products of highly levered durable goods producers.

negative, significant coefficient on market-to-book interacted with board size indicates that value firms with large boards fared poorly during the Depression. This is consistent with the argument (Denis (2001)) that value firms need close oversight (by smaller boards), or else they might squander resources. The negative coefficient on market-to-book interacted with the fraction of insiders indicates that growth firms with insider boards fared relatively well during the Depression. This is consistent with the argument (Denis (2001)) that growth firms might benefit from insider oversight, due to the insider's operational expertise. The negative coefficient on market-to-book interacted with leverage implies that growth firms with substantial debt fared poorly during the Depression (Myers (1977)). However, the latter two interactive variables are not generally significant. In Section V we further examine the interactive M/B effects, allowing for nonlinearities.

B. Panel Analysis of the Predictors of Financial Distress During the Depression

In this section we investigate the causes financial distress in the current year, for each year 1930 to 1938. For this analysis, we use an unbalanced panel of data from 1929 to 1938. We use a conditional logistic model to identify the lagged firm characteristics that predict financial distress during the current year, conditional on a firm not being distressed during the previous year. If a firm becomes distressed we delete it from the sample for future years. The dependent variable DISTRESS equals one if the firm becomes distressed during the current year and zero otherwise.

In this section the explanatory variables include firm size, operating profits, leverage, age, liquidity, and the governance variables (board size and percentage of insiders). All the firm characteristic variables are once lagged except for bond rating, which instead is the 1928 rating for the entire panel. This is because Moody's ratings were not reported for several years during the

Depression. We also include a dummy variable that has a value of one in 1933 and later, to control for the effect of the U.S. leaving the gold standard.

Table 4 summarizes the results of the logistic regression of DISTRESS on the explanatory variables. The estimated coefficients indicate that leverage in the current year is a good predictor of distress in the following year, which is consistent with the result in Section IV.A. We also find that the coefficients on board size and inside directors are significant and have the expected signs. This is consistent with the result in Table 3 that poorer internal governance led to a higher probability of distress during the Depression.

The estimated coefficients on operating profits and size are both negative and significant. This indicates that firms with lower operating profits and smaller market equity in the current period have a higher probability of becoming financially distressed in the following year. When taken in conjunction with our results from Table 3, this indicates that although size and operating profits in 1928 were not significant predictors of distress over the next decade, firms that experienced a substantial reduction in profits and/or market equity were particularly likely to become distressed as the Depression continued. That is, the firms that eventually became distressed grew smaller in size and increasingly less profitable in the year(s) preceding distress.

We also find that stock return has a negative and significant coefficient, indicating that stock returns decline in the year before a firm becomes distressed. However, lagged stock price volatility (our proxy for cash flow risk) does not predict the occurrence of distress. Finally, we find that liquidity is negatively correlated with DISTRESS and is significant, as expected.

The last column of Table 4 summarizes the results for a specification that includes a dummy variable for the years after the U.S. abandoned the gold standard. This variable is insignificant;

therefore, we do not find evidence consistent with gold standard affecting corporate solvency for our sample of firms.

V. Value Loss During the Great Depression

In this section we examine firm valuation during the Depression, to gain a better understanding of the economic importance of the characteristics that led to distress or poor performance. Relative to modern research, this analysis also provides "out of sample" estimates of some important quantities. For example, in this section we estimate the value loss associated with having debt. Warner (1977), Weiss (1990), and Andrade and Kaplan (1998) estimate costs of distress for specialized and/or small samples. In contrast, we estimate the ex post cost of having debt for all industrial firms on the NYSE. This gives us a feel for the costs of debt should an extremely negative economic event occur. We also explicitly investigate the interaction of the costs of debt with a firm's growth options, and similarly for board size.

To analyze the interaction of debt costs with growth options, we sort the firms into portfolios based on 1928 leverage ratios and 1928 market to book ratios. We sort the firms based on their market to book ratios to separately study the impact of leverage on 'growth' and 'value' firms. Sorting creates unconditional quartiles of debt and unconditional quartiles of M/B. This sorting produces sixteen portfolios. For each of these portfolios we report the cumulative change in average valuation (measured with Tobin's q) of the highest leverage portfolio and the lowest leverage portfolio. We then calculate the difference in cumulative market valuation between these two portfolios over time to determine the impact of leverage on firm valuation during the Depression.

In Panel A of Table 5 we present the difference in the cumulative change in valuation

between the lowest leverage portfolio and the highest leverage portfolio. Panel A of Figure 5 shows the cumulative change in market valuations for the lowest and highest leverage portfolios in each of the four market to book quartiles.

Figure 5 (and Panel A of Table 5) indicates that leverage had noticeable effects only on value (i.e., low M/B) firms. For growth firms (shown in the bottom two panels of Figure 5, Panel A), market valuation fell considerably by 1932, and in the case of the highest growth firms, never fully recovered. This holds for both high and low debt firms. In contrast, for value firms (the top two panels of Panel A), market valuation fell through the early 1930s, regardless of the amount of debt. However, low-leverage value firms recovered much more rapidly than high-leverage value firms in the second half of the Depression. By 1938, the difference in valuations on account of leverage was more than 40% for the portfolios in the lowest market to book quartile, and more than 30% for the next lowest market to book quartile.[17]

Finding a significant negative effect of leverage for value firms, but not for growth firms, is somewhat surprising because it is often argued that growth firms are more susceptible to debt-induced value loss. For example, Myers (1977) argues that shareholders might not exercise positive NPV growth options in firms that already have substantial debt because the benefit of the new project might accrue to existing debtholders. At least for our sample, we do not detect this effect. (It is of course true that there may not have been many positive NPV projects during the Depression, nor funds to pursue positive NPV projects, so this might not be the ideal environment to test Myers' hypothesis.) Instead, our results indicate that value firms recovered reasonably well during the Depression, and more so for value firms with less debt. This is consistent with debt burden limiting

[17]To ensure that our results are not driven by industry effects, we conduct a similar analysis using only manufacturing firms. We find very similar results for manufacturing firms. Moreover, the results are confirmed in a multivariate regression that controls for profitability, size, age, and industry effects.

the recovery of high-debt firms, relative to low debt firms. This negative effect is a cost of debt that is highlighted during the Depression for value firms. In contrast, growth firms did not recover during the Depression, whether they had debt or not.

We also analyze the value loss attributable to having a large board of directors. Panel B of Table 5 (and Figure 5) summarizes the results. Among value firms, we find that firms with large boards recovered more slowly than small board firms. This could be because value firms are relatively mature firms and have limited investment opportunities. This could lead to greater agency problems in these firms, increasing the importance of having efficient, well functioning boards to alleviate agency problems. Since value firms with smaller boards recover faster than firms with larger boards, the results support the view that larger boards are less efficient than smaller boards in terms of addressing "mature firm" agency problems. Turning to growth firms, we find that, in general, they do not recover during the second half of the Depression. Although not statistically significant, the value loss among growth firms is greater in those firms with small boards, relative to those with large boards. This is consistent with growth firms benefitting from having more board members, some of whom could be experts that help the firm navigate an extreme economic calamity (Denis (2001)). Overall, our results indicate that the effect of board size on business solvency is nonlinear and conditional on investment opportunities.

VI. Debt Usage During the Post-Depression Years

We conclude by examining whether the Depression experience appears to have affected the post-Depression use of debt.[18] There is a traditional argument that managers observed how damaging debt could be during the Depression and therefore used less debt in the ensuing years (e.g., Miller

[18] We thank Harry DeAngelo for suggesting this analysis.

(1977) and Burch, Christie, and Nanda (2003)). This argument is based largely on anecdotal evidence.[19] We are not aware of any systematic research that confirms this line of thought. Table 2 shows that debt ratios fell during the Depression, which could be consistent with firms shying away from debt but could also be consistent with banks and public markets being less willing to lend, or greatly increasing the cost of borrowed funds.

In Panel A of Table 6 we show that leverage decreased significantly during the Depression and stayed low long after. Though not shown in the table, this gradual reduction in debt occurred for firms with investment grade ratings in 1928 as well as for firms with speculative debt. As late as 1948, by which time economic conditions had significantly improved, the mean leverage ratio was less than 10%. Figure 6 graphs mean and median leverage during the Depression years, in 1945, and in 1948.

Panel B examines the factors that are correlated with the change in debt from 1938 to 1948. We include some typical capital structure explanatory variables but also examine whether there is any evidence of managerial fixed effects in the 1940s that are linked Depression-era experiences. In terms of the standard variables, firms that were profitable in 1938 increased their use of debt in the 1940s. Other variables such as volatility, M/B, size, and firm age are not significant.

The regression includes a collection of variables that attempt to measure whether firms that experienced firsthand the costs of debt maintained low leverage after the Depression. The high-debt, low M/B firms that were identified in Table 5 as experiencing high costs of debt during the

[19] Leslie Kaufman with Claudia H. Deutsch (New York Times, December 29, 2000) report on the demise and eventual bankruptcy of Montgomery Ward, which had been the retail market leader in the pre-Depression years: "…[W]hatever the immediate reason, Ward's demise was long in the cards. Retail historians date the start of the decline to the postwar boom of the 1950's, when its rival, Sears, Roebuck & Company, moved aggressively into the then nascent suburbs, while Ward, under the steely leadership of its then chief executive, Sewell Avery, hoarded cash and waited for a second Great Depression. 'It has been a slow-motion train wreck,' said Sid Doolittle, a Chicago-based retail consultant who was an executive with the company for 28 years." Montgomery Ward liquidated in 2000.

Depression decrease their use of debt by between six and nine percent during the 1940s.[20] However, this debt reduction occurs for all firms that had high debt in 1928, not just value firms. In contrast, firms with low debt in 1928 do not statistically increase their use of debt during the 1940s. This evidence does not discriminate that firms that firsthand experienced the costs of debt used less debt later (because all high debt firms reduce their use of debt, not just those that experienced high costs). One exception to this conclusion pertains to the 30 firms that became distressed during the Depression but that reorganized and emerged as new firms in the 1940s. The "Distress dummy" variable that isolates these firms is negative in all the specifications in Table 6 (but significant in just the first specification). This result is consistent with firm-specific Depression experiences affecting the use of debt in the 1940s.

Finally, we examine whether the personal experiences of the company president might have affected the debt policy at his firm during the 1940s. For 190 of the sample firms, the company president retired or otherwise left the firm between 1938 and 1948. For these firms there is a statistically significant increase of 300 basis points in the amount of debt used at their firms. Given that the mean debt ratio was only eight percent in 1938, this is an economically large effect. Note that there was not a corresponding effect when the chairman of the board of directors changed.

In column (3) of Table 6, the specification includes four variables that interact change in president with high/low debt/market-to-book combinations as of 1938. These variables indicate that value firms with low debt increased their use of debt in the 1940s when the president left the firm. Given that the conclusion from Table 5 indicates that low debt value firms fared well during the

[20]Note that Table 6 defines firms that experienced the high costs of debt based on Table 5, that is, based on their 1928 quartiles of debt and market-to-book ratio. Some specifications in Table 6 also include variables based on high or low debt, market-to-book combinations in 1938. Again, the coefficients on these variables indicate that high debt firms reduced their amount of debt in the 1940s, regardless of the market-to-book ratio, but low debt firms had no significant increase in the amount of debt.

Depression, presidential experiences might lead to these firms maintaining little debt. However, our results indicate that if this experience factor is present, it was forgotten soon after the president left, because on average these companies levered up when the president changed.[21]

Overall, the results in Table 6 indicate that any continuing effect on 1940s debt policy that emanated from the Depression generally occurred across all firms (perhaps from managers observing what happened at high debt firms in general, not just at their own firm). However, when the company president left the firm, his experience appears to have left the firm with him, because on average debt ratios increased at firms that experienced a change in president.

VII. Conclusion

The Great Depression is one of the most important economic events of the twentieth century. This paper presents the first large-scale microeconomic analysis of corporate performance and survival during the era. Firm-level data are used to investigate how characteristics like leverage, size, profitability, age, governance, and investment affect corporate solvency during the Depression.

Our results indicate that highly levered firms had a high probability of becoming financially distressed during the Great Depression. Our results also indicate that firms that had larger boards of directors and a higher concentration of internal directors had higher probabilities of becoming distressed. This is in line with the results obtained from more recent years that indicate large, insider-dominated boards to be less efficient.

We also find that during the Depression, the consequence of higher leverage was significant for 'value' firms. Value firms with low leverage recovered sooner than their more highly levered

[21]Though not shown in the table, the increased use of debt upon presidential change is not statistically different conditional on whether the president is replaced by an outsider or someone who was an officer of the firm during the Depression.

counterparts. High-leverage value firms lost almost half of their value, relative to low-leverage value firms. We also find that value firms with larger boards recovered more slowly than those with smaller boards, supporting the view that smaller boards are more effective in monitoring value firms.

Our governance results are stronger than those found in research investigating the past few decades. Recent papers indicate that board characteristics might affect the decisions that firms make (e.g., Weisbach (1988)) but are less often linked to firm valuation or solvency (e.g., Hermalin and Weisbach (1991)). One possible explanation for our finding stronger results is that we study a negative shock that was more devastating than has been previously studied, which may provide more power to identify governance inefficiencies. Another possibility is that recent research investigates the SEC era, while most of our sample predates the creation of the SEC. It would be interesting for future research to study whether the creation of the SEC appears to have affected governance in such a way as to reduce the effect of governance on solvency and valuation.

Finally, we find that, on average, firms used less debt in the years following the Depression, even during periods of economic stability and growth. This is consistent with companies "staying away from fire" after having observed the negative consequences across the economy during the Depression. To the extent that this is true, it occurred across the economy as high debt firms reduced indebtedness during the 1940s (but low debt firms did not lever up). This "fear of debt" appears to have become smaller upon the departure of the company president. This finding complements intriguing recent research by Bertrand and Shoar (2003) that executive-specific effects influence corporate decision-making. This area deserves further attention.

References

Andrade, Gregor and Steven Kaplan. "How Costly is Financial (Not Economic) Distress? Evidence From Highly Levered Transactions That Became Distressed," *Journal of Finance*, 1998, 53, 1443-1493.

Banerjee, Ajeyo and E. Woodrow Eckard. "Why Regulate Insider Trading? Evidence From the First Great Merger Wave (1897-1903)," *American Economic Review*, 2001, 95(5), 1329-1349.

Barnhart, Scott W., M. Wayne Marr, and Stuart Rosenstein. "Firm Performance and Board Composition: Some New Evidence," *Managerial and Decision Economics*, 1994, 15, 329-340.

Baysinger, Robert D. and Henry N. Butler. "Corporate Governance and the Board of Directors: Performance Effects on the Changes in Board Composition," *Journal of Law, Economics and Organization*, 1985, 1, 101-124.

Berger, Philip G., Eli Ofek, and David Yermack. "Managerial Entrenchment and Capital Structure Decisions," *Journal of Finance*, 1997, 52, 1411-1438.

Berle, Adolf A. Jr., and Gardiner C. Means. *The modern corporation and private property*, Harcourt, Brace & World, New York, 1932.

Bernanke, Ben. "Nonmonetary Effects of the Financial Crisis in Propagation of the Great Depression," *American Economic Review*, 1983, 73, 257-76.

Bernanke, Ben. "The Macroeconomics of the Great Depression: A Comparative Approach," *Journal of Money, Credit and Banking*, 1995, 27(1), 1-28.

Bernstein, Michael A. *The Great Depression*, Cambridge: Cambridge University Press, 1987.

Bertrand, Marianne, and Antoinette Schoar. "Managing with Style: The Effect of Managers on Firm Policies," *Quarterly Journal of Economics*, 2003, forthcoming.

Burch, Timothy R., William G. Christie, Vikram Nanda. "Do Firm's Time Equity Offerings? Evidence From Rights and Firm Commitment Offers During the 1930s and 1940s," Working Paper, University of Miami, July 2003.

Campello, Murillo, and Zsuzsanna Fluck. "Market Share, Financial Leverage, and the Macroeconomy: Theory and Empirical Evidence," Working Paper, University of Illinois, 2003.

Chevalier, Judith. "Capital Structure and Product-Market Competition: Empirical Evidence from the Supermarket Industry," *American Economic Review*, 1995a, 85, 415-435.

Chevalier, Judith. "Do LBO Supermarkets Charge More? An Empirical Analysis of the Effects of LBOs on Supermarket Pricing," *Journal of Finance*, 1995b, 50, 1095-1112.

Chevalier, Judith, and David Scharfstein. "Capital-Market Imperfections and Counter-Cyclical Markups: Theory and Evidence," *American Economic Review*, 1996, 86, 703-725.

Christie, William G. and Vikram Nanda. "Free Cash Flow, Shareholder Value, and the Undistributed Profits Tax of 1936 and 1937," *Journal of Finance* 49,1994,1727-1754

Denis, Diane K. "Twenty Five Years of Corporate Governance Research…and Counting, *Review of Financial Economics*, 2001, 10, 191-212.

Ely, Kirsten and Gregory Waymire. "Intangible Assets and Stock Prices During the Pre-SEC Era," *Journal of Accounting Research*, Supplement 1999, 37,17-44.

Field, Alexander J. "The Most Technologically Progressive Decade of the Century,"*American Economic Review*, 2003, 93, 1399-1413.

Gompers, Paul A., Andrew Metrick, Joy L. Ishii. "Corporate Governance and Equity Prices," *Quarterly* Journal of Economics, 2003, 118, 107-155.

Gordon, Roger A. "Stockholdings of Officers and Directors in American Industrial Corporations," *Quarterly Journal of Economics*, 1936, 50, 622-657.

Gordon, Roger A. "Ownership by Management and Control Groups in Large Corporations," *Quarterly Journal of Economics,* 1938, 52, 367-400.

Graham, John R. "How Big are the Tax Benefits of Debt?," *Journal of Finance*, 2000, 55, 1901-1941.

Hadlock, Charles J. and Gerald B. Lumer. "Compensation, Turnover, and Top Management Incentives: Historical Evidence," *Journal of Business*, 1997, 70(2), 153-187.

Hermalin, Benjamin and Michael Weisbach. "The Effects of Board Composition and Direct Incentives on Firm Performance," *Financial Management*, 1991, 20, 101-112.

Holderness, Clifford G., Randall S. Kroszner, and Dennis P. Sheehan. "Were the Good Old Days That Good? Changes in Managerial Stock Ownership Since the Great Depression," *Journal of Finance*, 1999, 54(2), 435-469.

Hunter, Helen Manning. "The Role of Business Liquidity During the Great Depression and Afterwards: Differences Between Large and Small Firms," *Journal of Economic History*, 1982, 42, 883-902.

Jensen, Michael C. "The Modern Industrial Revolution, Exit and the Failure of Internal Control Systems," *Journal of Finance*, 1993, 48, 831-880.

Jensen, Michael C., and William H. Meckling. "Theory of the Firm: Managerial Behavior, Agency Cost and Ownership Structure," *Journal of Financial Economics,* 1976, 3, 305-360.

Jensen, Michael. "Agency Cost of Free Cash Flow, Corporate Finance, and Free Cash Flows," *American Economic Review*, 1986, 76, 323-329.

Johnson, Simon, Peter Boone, Alasdir Breach, and Eric Friedman. "Corporate Governance in the Asian Financial Crisis," *Journal of Financial Economics*, 2000, 58, 141-186.

Jovanovic, Boyan and Peter L. Rousseau. "Technology and the Stock market: 1885 – 1998," Working paper, Vanderbilt University, 2000.

Khanna, Naveen, and Sheri Tice. "Pricing, Predation and Location Decisions of Firms: Evidence on the Role of Debt and Operating Efficiency," Tulane University, Working Paper, 2003.

Lemmon, Michael L. and Karl V. Lins. "Ownership Structure, Corporate Governance, and Firm Value: Evidence from the East Asian Financial Crisis," *Journal of Finance*, 2003, 58(4), 1445-1468.

Lipton, Martin and Jay W. Lorsch. "A Modest Proposal for Improved Corporate Governance," *Business Lawyer*, 1992, 48(1), 59-77.

McConnell, John J., and Henri Servaes. "Additional Evidence on Equity Ownership and Corporate Value," *Journal of Financial Economics*, 1990, 27(2), 595-612.

Miller, Merton. "Debt and Taxes," *Journal of Finance*, 1977, 32, 261-275.

Morck, Randall, Andrei Shleifer, and Robert W. Vishny. "Management Ownership and Market Valuation: An Empirical Analysis," *Journal of Financial Economics*, 1988, 20, 293-315.

Myers, Stewart C. "Determinants of Corporate Borrowing," *Journal of Financial Economics*, 1977, 5, 147-175.

Opler, Tim C., and Sheridan Titman. "Financial Distress and Corporate Performance," *Journal of Finance*, 1994, 59, 1015-1040.

Phillips, Gordon. "Increased Debt and Industry Product Markets: An Empirical Analysis," *Journal of Financial Economics*, 1995, 37, 189-237.

Rosenstein, Stuart and Jeffery G. Wyatt. "Outside Directors, Board Independence and Shareholder Wealth," *Journal of Financial Economics*, 1990, 26, 175-191.

Safieddine, Aseem and Sheridan Titman. "Leverage and Corporate Performance: Evidence From Unsuccessful Takeovers," *Journal of Finance*, 1999, 54, 547-580.

Scott, J. H., Jr. "A Theory of Optimal Capital Structure," *Bell Journal of Economics*, 1976, 7, 33-54.

Shleifer, Andrei and Robert W. Vishny. "A Survey of Corporate Governance," *Journal of Finance*, 1997, 52, 737-783.

Shumway, Tyler. "Forecasting Bankruptcy More Accurately: A Simple Hazard Model," *Journal of Business,* 2001, 74, 101-124.

Stigler, George J., and Claire Friedland. "The Literature of Economics: The Case of Berle and Means" *Journal of Law and Economics*, 1983, 26, 237-268.

Taussig, F. W. and W. S. Baker. "American Corporations and Their Executives: A Statistical Inquiry," *Quarterly Journal of Economics*, 1925, 40(1), 1-51.

Titman, Sheridan and Roberto Wessels. "The Determinants of Capital Structure Choice," *Journal of Finance*, 1988, 43, 1-19.

Weisbach, Michael. "Outside Directors and CEO Turnover," *Journal of Financial Economics*, 1988, 20, 431-460.

Weiss, Lawrence. "Bankruptcy Resolution," *Journal of Financial Economics*, 1990, 27, 285-314.

Werner, Walter. "Management, Stock Market and Corporate Reform: Berle and Means Reconsidered," *Columbia Law Review*, 1977, 77, 388-417.

Yermack, David. "Higher Market Valuation of Companies with a Small Board of Directors," *Journal of Financial Economics,* 1996, 40, 185-221.

Zingales, Luigi. "Survival of the Fittest or Fattest? Exit and Financing in the Trucking Industry," *Journal of Finance*, 1998, 53, 905-938.

TABLE 1 – SUMMARY STATISTICS FOR 1928

Panel A: Summary Statistics -

Variable	N	Mean	Median	Stdev	Max	Min
Operating Profit	446	0.09	0.08	0.11	1.33	-0.30
Leverage	446	0.12	0.07	0.14	0.74	0.00
Fixed Assets ($ million)	446	35.60	10.60	103.00	1660.00	0.00
Total Assets ($ million)	446	70.80	24.40	175.00	2440.00	0.40
Rating	446	5.84	6.00	1.50	9.00	3.00
Board Size	446	11.10	10.00	4.18	37.00	4.00
Insider Directors (proportion)	446	0.40	0.38	0.18	1.00	0.06
Age	446	22.70	18.50	17.00	168.00	1.00

Panel B: Correlation Matrix

	Oper. Profit	Total Assets	Leverage	Rating	Age	Ins. Dir.	Board Size
Operating Profit	1.00						
Total Assets	0.00	1.00					
Leverage	-0.22***	0.00	1.00				
Rating	0.35***	0.35***	-0.23***	1.00			
Age	0.06	0.12**	-0.08*	0.15***	1.00		
Inside Directors	0.09**	-0.07	-0.01	0.08	-0.01	1.00	
Board Size	-0.01	0.33***	0.02	0.28***	0.03	-0.34***	1.00

Notes: The table gives summary statistics for 1928. Operating profit is calculated as earnings before interest and tax (EBIT) divided by the total assets of the firm. Leverage is calculated as the ratio of total debt to total assets. Assets are measured in millions of dollars. Ratings ranges from 1 to 9, with 9 representing AAA, the highest possible rating, and 1 representing C, the lowest rating in our sample. Board size is the number of directors on the board. Inside Directors is the fraction of directors that are also listed as officers of the firm. Age is the number of years the firm had been in existence as of 1928. ***, **, * represent significance at 1%, 5%, and 10% levels respectively

TABLE 2 - SUMMARY STATISTICS, BY YEAR AND ENTIRE PANEL

Variable	Year	Mean	Median	Std. Dev.	Max	Min
Profitability	1928	0.09	0.08	0.11	1.33	-0.30
Leverage	1928	0.12	0.07	0.14	0.74	0.00
Fixed Assets ($ million)	1928	35.60	10.60	103.00	1660.00	0.00
Total Assets ($ million)	1928	70.80	24.40	175.00	2440.00	0.40
Board Size	1928	11.10	10.00	4.18	37.00	4.00
Inside Directors	1928	0.40	0.38	0.18	1.00	0.06
Profitability	1932	-0.01	-0.01	0.10	0.53	-0.86
Leverage	1932	0.10	0.02	0.14	0.80	0.00
Fixed Assets ($ million)	1932	40.60	10.00	128.00	1650.00	0.00
Total Assets ($ million)	1932	74.20	21.00	198.00	2160.00	0.93
Board Size	1932	10.78	10.00	4.21	36.00	4.00
Inside Directors	1932	0.40	0.38	0.19	1.00	0.05
Profitability	1933	0.03	0.02	0.07	0.34	-0.33
Leverage	1933	0.10	0.01	0.14	0.74	0.00
Fixed Assets ($ million)	1933	41.40	9.09	129.00	1650.00	0.00
Total Assets ($ million)	1933	76.80	20.30	203.00	2100.00	0.85
Board Size	1933	10.80	10.00	4.30	36.00	4.00
Inside Directors	1933	0.41	0.38	0.19	1.00	0.05
Profitability	1938	0.05	0.04	0.11	1.30	-0.28
Leverage	1938	0.08	0.01	0.12	0.77	0.00
Fixed Assets ($ million)	1938	43.20	9.74	121.00	1170.00	0.04
Total Assets ($ million)	1938	83.00	21.80	207.00	2040.00	0.64
Board Size	1938	10.91	10.00	4.37	36.00	3.00
Inside Directors	1938	0.41	0.39	0.18	1.00	0.08
Profitability	1926 to 1938	0.06	0.05	0.10	1.34	-0.86
Leverage	1926 to 1938	0.10	0.04	0.14	0.99	0.00
Fixed Assets ($ million)	1926 to 1938	40.30	10.20	118.00	1710.00	0.00
Total Assets ($ million)	1926 to 1938	77.40	23.90	195.00	2450.00	0.40
Board Size	1926 to 1938	11.06	10.00	4.30	37.00	2.00
Inside Directors	1926 to 1938	0.40	0.38	0.20	3.50	0.05

Notes: The table contains summary statistics for key years and for the entire sample. Profitability is calculated as earnings before interest and tax (EBIT) divided by the total assets of the firm. Leverage is calculated as the ratio of total debt to total assets. Fixed Assets and Total Assets are measured in millions of dollars. Board size is the number of directors on the board. Inside Directors is the fraction of directors that are also listed as officers of the firm.

TABLE 3 - LOGISTIC REGRESSION OF DISTRESS DURING THE DEPRESSION ON EXPLANATORY VARIABLES MEASURED IN 1928

Distress	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
M/B	-0.02	-0.02	-0.01	0.87**	0.19	-0.26	2.13**	2.19**
	(0.7040)	(0.7140)	(0.8940)	(0.0280)	(0.3160)	(0.1650)	(0.0270)	(0.0210)
Return	-0.12	-0.12	-0.09	-0.05	-0.10	-0.09	-0.08	-0.08
	(0.3300)	(0.3300)	(0.4940)	(0.6860)	(0.4290)	(0.4720)	(0.5300)	(0.5400)
Volatility	-0.04	-0.04	-0.04	-0.03	-0.04	-0.04	-0.02	-0.03
	(0.1720)	(0.1760)	(0.1980)	(0.2940)	(0.1780)	(0.2550)	(0.3520)	(0.3330)
Operating Profit	-1.75	-1.72	-1.44	-1.79	-1.22	-0.87	-1.17	-1.02
	(0.3580)	(0.3650)	(0.4410)	(0.3560)	(0.5140)	(0.6680)	(0.5260)	(0.5640)
Size	-0.12	-0.12	-0.22	-0.17	-0.22*	-0.18	-0.13	-0.13
	(0.3310)	(0.3420)	(0.1000)	(0.1890)	(0.0940)	(0.1840)	(0.3300)	(0.3400)
Leverage	4.13***	4.18***	4.06***	3.99***	4.04***	2.84**	3.38***	3.47***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0210)	(0.0060)	(0.0050)
Rating	-2.28***	-2.28***	-2.35***	-2.36***	-2.35***	-2.39***	-2.40***	-2.43***
	(0.0020)	(0.0020)	(0.0010)	(0.0010)	(0.0010)	(0.0010)	(0.0010)	(0.0010)
Investment	1.02*	1.04**	1.25**	1.32**	1.24**	1.22**	1.24**	1.31**
	(0.0550)	(0.0480)	(0.0120)	(0.0150)	(0.0120)	(0.0140)	(0.0210)	(0.0130)
Current Assets	-0.14	-0.12	-0.45	-0.43	-0.47	-0.43	-0.49	-0.46
	(0.8360)	(0.8590)	(0.5270)	(0.5500)	(0.5130)	(0.5450)	(0.4970)	(0.5200)
Age	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01
	(0.1540)	(0.1500)	(0.1600)	(0.1210)	(0.1630)	(0.1700)	(0.1260)	(0.1160)
Board Size			0.89*	1.46**	0.89*	0.88*	1.76***	1.87***
			(0.0840)	(0.0170)	(0.0860)	(0.0880)	(0.0090)	(0.0050)
% Insiders			2.59***	2.64***	3.14***	2.64***	4.25***	4.47***
			(0.0030)	(0.0030)	(0.0030)	(0.0030)	(0.0020)	(0.0010)
M/B x Board Size				-0.44**			-0.82**	-0.84***
				(0.0280)			(0.0100)	(0.0090)
M/B x % Insiders					-0.45		-1.46	-1.48*
					(0.2910)		(0.1110)	(0.0950)
M/B x Leverage						0.79	0.31	0.32
						(0.1480)	(0.5800)	(0.5620)
Durable Goods		0.10	0.26	0.25	0.27	0.26		0.29
		(0.7170)	(0.3770)	(0.4020)	(0.3680)	(0.3760)		(0.3280)
Intercept	1.67	1.63	-2.25	-3.01	-2.51	-1.56	-3.59	-4.00
	(0.4040)	(0.4120)	(0.3840)	(0.2460)	(0.3320)	(0.5520)	(0.2110)	(0.1540)

Notes: The table provides the parameter estimates of the logistic regression of Distress on 1928 firm characteristics. We use a binary variable, Distress, as the dependent variable in our logistic regression; the variable takes the value 1 if the firm liquidated, filed for bankruptcy, undertook a court ordered reorganization because of bankruptcy filings, undertook a recapitalization when its stock became worthless, or was explicitly listed as being financially distressed during the Depression and 0 otherwise. M/B is the market equity divided by book equity. Return and Volatility are measured as the firm's stock return and volatility during 1927. Operating profit is earnings before interest and tax (EBIT) divided by total assets. Leverage is the ratio of total debt to total assets. Size is the ratio of the market capitalization of the firm to the total market capitalization of all the firms listed on CRSP. Ratings ranges from 1 to 9, with 9 representing AAA and 1 representing C. Investment during the year is calculated as the difference in fixed assets between the beginning and the end of the year. Current assets are used to measure liquidity. Age is the number of years the firm has been in existence. Board Size is the log of the number of members on the board. % Insiders is the fraction of insiders on the board. The Durable Goods indicator variable has a value of 1 if a firm is assigned a 1-digit SIC code of 1, 3, or 4. The coefficients are shown with the p values, obtained using robust standard errors, in parentheses. ***, **, * represent significance at 1, 5, and 10% respectively.

TABLE 4 - LOGISTIC REGRESSION OF DISTRESS ON ONCE LAGGED EXPLANATORY VARIABLES, USING PANEL DATA

Distress	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
M/B	0.04	0.03	0.05	1.70**	-0.13	0.14	2.59*	2.63*	2.72*
	(0.4210)	(0.4320)	(0.2550)	(0.0320)	(0.5100)	(0.3560)	(0.0600)	(0.0590)	(0.0550)
Return	-0.82**	-0.81**	-0.73**	-0.69**	-0.74**	-0.74**	-0.70**	-0.70**	-0.79**
	(0.0130)	(0.0150)	(0.0210)	(0.0230)	(0.0210)	(0.0190)	(0.0200)	(0.0210)	(0.0140)
Volatility	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	(0.8260)	(0.8480)	(0.8480)	(0.9770)	(0.8560)	(0.8360)	(0.9950)	(0.9780)	(0.8550)
Operating profit	-5.75***	-5.82***	-6.06***	-6.02***	-6.09***	-6.08***	-6.01***	-6.05***	-6.20***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Size	-0.49***	-0.49***	-0.55***	-0.51***	-0.55***	-0.55***	-0.52***	-0.52***	-0.52***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Leverage	2.67**	2.62***	2.60***	2.59***	2.59***	2.69***	2.85***	2.82***	2.80***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Rating	-0.04	-0.03	-0.05	-0.06	-0.05	-0.05	-0.07	-0.06	-0.08
	(0.6980)	(0.7550)	(0.6110)	(0.5150)	(0.5880)	(0.6060)	(0.4880)	(0.5280)	(0.4290)
Investment	-0.59**	-0.59**	-0.54**	-0.54**	-0.54**	-0.54**	-0.54**	-0.54**	-0.55**
	(0.0310)	(0.0290)	(0.0460)	(0.0460)	(0.0460)	(0.0450)	(0.0460)	(0.0450)	(0.0430)
Current Assets	-2.13***	-2.12***	-2.29***	-2.23***	-2.30***	-2.30***	-2.18***	-2.23***	-2.24***
	(0.0020)	(0.0020)	(0.0010)	(0.0010)	(0.0010)	(0.0010)	(0.0010)	(0.0010)	(0.0010)
Age	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01
	(0.3170)	(0.3240)	(0.2510)	(0.2490)	(0.2570)	(0.2510)	(0.2290)	(0.2410)	(0.1950)
Board Size			0.87**	1.11**	0.88**	0.88**	1.21***	1.20***	1.29***
			(0.0440)	(0.0120)	(0.0410)	(0.0410)	(0.0070)	(0.0070)	(0.0050)
% Insiders			1.08**	1.11**	1.00**	1.09**	1.28**	1.27**	1.34**
			(0.0250)	(0.0170)	(0.0330)	(0.0240)	(0.0130)	(0.0140)	(0.0110)
M/B x Board Size				-0.84**			-1.04*	-1.05*	-1.09*
				(0.0410)			(0.0550)	(0.0560)	(0.0520)
M/B x % Insiders					0.41		-0.64	-0.66	-0.67
					(0.3690)		(0.4290)	(0.4150)	(0.4120)
M/B x Leverage						-0.28	-0.72	-0.73	-0.73
						(0.5160)	(0.2980)	(0.2790)	(0.3020)
Durable Goods		-0.13	-0.08	-0.08	-0.08	-0.08		-0.09	-0.09
		(0.5820)	(0.7380)	(0.7360)	(0.7470)	(0.7360)		(0.7000)	(0.7010)
Off Gold Standard									0.28
									(0.2610)
Intercept	-7.70***	-7.69***	-10.54***	-10.59***	-10.51***	-10.67***	-11.07***	-11.03***	-11.25***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)

Notes: The table provides the parameter estimates of the logistic regression of Distress on one-year lagged firm characteristics (except ratings, which are 1928 ratings). We use a binary variable, Distress, as the dependent variable in our logistic regression; the variable takes the value 1 if the firm liquidated, filed for bankruptcy, undertook a court ordered reorganization because of bankruptcy filings, undertook a recapitalization when its stock became worthless, or was explicitly listed as being financially distressed during the Depression and 0 otherwise. M/B is the market equity divided by book equity. Return and Volatility are measured as the firm's stock return and volatility during the previous year. Operating profit is earnings before interest and tax (EBIT) divided by total assets. Leverage is the ratio of total debt to total assets. Size is the ratio of the market capitalization of the firm to the total market capitalization of all the firms listed on CRSP. Ratings ranges from 1 to 9, with 9 representing AAA and 1 representing C. Investment during the year is calculated as the difference in fixed assets between the beginning and the end of the year. Current assets are used to measure liquidity. Age is the number of years the firm has been in existence. Board Size is the log of the number of members on the board. % Insiders is the fraction of insiders on the board. The Durable Goods indicator variable has a value of 1 if a firm is assigned a 1-digit SIC code of 1, 3, or 4. The Off Gold Standard indicator is 0 until 1933 and 1 thereafter. The coefficients are shown with the p values, obtained using robust standard errors corrected for clustering, in parentheses. ***, **, * represent significance at 1, 5, and 10% respectively.

TABLE 5 – VALUE LOSS, CONDITIONAL ON GROWTH OPTIONS, LEVERAGE AND BOARD SIZE

Panel A: Consequence of Leverage on Firm Value During The Depression

	(1) Low M/B (value)			(2) Low-Mid M/B			(3) Mid-High M/B			(4) High M/B (growth)		
	Low Debt	High Debt	Low-High	Low Debt	High Debt	Low-High	Low Debt	High Debt	Low-High	Low Debt	High Debt	Low-High
1928-1929	-0.2074	-0.1345	-0.0728	-0.2049	-0.1906	-0.0143	-0.2860	-0.2405	-0.0455	-0.3487	-0.4557	-0.1070
1928-1930	-0.2534	-0.2375	-0.0159	-0.2049	-0.3561	0.1512*	-0.4854	-0.4931	0.0078	-0.5708	-0.6760	0.1052
1928-1931	-0.4388	-0.2654	-0.1734	-0.5294	-0.3918	-0.1375	-0.6593	-0.5662	-0.0931	-0.7457	-0.7056	-0.0401
1928-1932	-0.2335	-0.3680	0.1344*	-0.4824	-0.5175	0.0351	-0.6341	-0.6237	-0.0105	-0.7581	-0.6687	-0.0893
1928-1933	0.2684	-0.2103	0.4787***	-0.0501	-0.3588	0.3087*	-0.4060	-0.4666	0.0605	-0.5888	-0.5978	0.0091
1928-1934	0.0759	-0.0289	0.1048**	0.0297	-0.4369	0.4666**	-0.3372	-0.4463	0.1091	-0.5618	-0.5866	0.0248
1928-1935	0.2649	-0.0176	0.2825**	0.3122	-0.1968	0.5090*	-0.2460	-0.2467	0.0007	-0.4295	-0.5239	0.0944*
1928-1936	0.6163	0.1325	0.4838***	0.5024	0.0194	0.4830**	-0.0601	-0.1046	0.0444	-0.3054	-0.4146	0.1091
1928-1937	0.4192	0.0078	0.4114***	0.1014	-0.1792	0.2807	-0.4364	-0.4333	-0.0031	-0.5375	-0.6169	0.0795
1928-1938	0.5497	0.1333	0.4163**	0.3602	0.0198	0.3404	-0.3289	-0.2902	-0.0386	-0.4794	-0.5554	0.0759

Notes: The percentage changes in market valuation (Tobin's q) between the portfolios containing firms in the highest and the lowest leverage quartiles during the year are shown. Column (1) presents the result for the lowest market-to-book quartile. Column (2) presents the result for the second quartile, Column (3) for the third quartile, and Column (4) presents the result for the highest market-to-book quartile. ***, **, * represent significance at 1, 5, and 10% respectively.

Panel B: Consequence of Board Size on Firm Value During The Depression

	(1) Low M/B (value)			(2) Low-Mid M/B			(3) Mid-High M/B			(4) High M/B (growth)		
	Small Board	Large Board	Small-Large	Small Board	Large Board	Small-Large	Small Board	Large Board	Small-Large	Small Board	Large Board	Small-Large
1928-1929	-0.2168	-0.1042	-0.1126	-0.2420	-0.1508	-0.0912	-0.3263	-0.2050	-0.1213	-0.4477	-0.3120	-0.1357
1928-1930	-0.2622	-0.2568	-0.0054	-0.3947	-0.3234	-0.0713	-0.4741	-0.4398	-0.0343	-0.6660	-0.4652	-0.2007
1928-1931	-0.3115	-0.2900	-0.0215	-0.4547	-0.5057	0.0510	-0.6141	-0.6409	0.0268	-0.7793	-0.6516	-0.1277
1928-1932	-0.3049	-0.3964	0.0915	-0.4491	-0.5682	0.1191*	-0.5691	-0.6708	0.1017	-0.8039	-0.6728	-0.1312
1928-1933	-0.0622	-0.2251	0.1629*	-0.1939	-0.2650	0.0711	-0.3773	-0.5122	0.1349	-0.6827	-0.5333	-0.1495
1928-1934	0.1626	-0.0595	0.2221**	-0.1302	-0.3020	0.1718	-0.3002	-0.4321	0.1319	-0.6369	-0.5108	-0.1261
1928-1935	0.1892	0.0006	0.1886*	-0.0543	-0.1140	0.0598	-0.1946	-0.2950	0.1005	-0.5207	-0.3800	-0.1407
1928-1936	0.4495	0.3410	0.1084	0.2463	0.0963	0.1500	-0.0070	-0.0793	0.0723	-0.4385	-0.2543	-0.1842
1928-1937	0.1818	-0.0147	0.1965*	-0.0336	-0.2130	0.1793	-0.4379	-0.4115	-0.0264	-0.6405	-0.5004	-0.1400
1928-1938	0.2913	0.0668	0.2246*	0.2296	-0.1390	0.3686*	-0.3203	-0.2981	-0.0222	-0.5828	-0.4075	-0.1754

Notes: The percentage changes in market valuation (Tobin's q) between the portfolios containing firms with different board sizes in 1928 are shown. Small stand for board sizes in the lowest quartile while Large stands for board sizes in the highest quartile. Column (1) presents the result for the lowest market-to-book quartile. Column (2) presents the result for the second quartile, Column (3) for the third quartile, and Column (4) presents the result for the highest market-to-book quartile. ***, **, * represent significance at 1, 5, and 10% respectively.

TABLE 6 – DID THE DEPRESSION EXPERIENCE AFFECT CAPITAL STRUCTURE IN THE 1940S?

Panel A: Leverage During The Depression and in 1945 and 1948

Year	Average Leverage	Median Leverage
1926	0.119	0.083
1927	0.122	0.085
1928	0.117	0.069
1929	0.116	0.069
1930	0.112	0.051
1931	0.115	0.039
1932	0.103	0.023
1933	0.096	0.014
1934	0.092	0.016
1935	0.088	0.009
1936	0.087	0.010
1937	0.086	0.019
1938	0.081	0.010
1945	0.089	0.008
1948	0.097	0.042

Panel B: Regression Examining Change in Leverage from 1938 to 1948

	(1)	(2)	(3)
MB	-0.01	-0.01	-0.01
	(0.1370)	(0.2230)	(0.2640)
Volatility	0.00	0.00	0.00
	(0.6820)	(0.5540)	(0.4500)
Profitability	0.13**	0.14**	0.13**
	(0.0330)	(0.0120)	(0.0260)
Size	0.00	0.00	0.00
	(0.9150)	(0.7170)	(0.9070)
Board Size	0.00	0.01*	0.00
	(0.1950)	(0.0770)	(0.1480)
Insiders	0.12***	0.11***	0.12***
	(0.0050)	(0.0060)	(0.0030)
Distress dummy	-0.07**	-0.03	-0.06
	(0.0310)	(0.4090)	(0.1130)
President change dummy	0.03**	0.02*	0.03**
	(0.0480)	(0.0910)	(0.0420)
Chairman change dummy	-0.02	-0.02	-0.01
	(0.2200)	(0.2440)	(0.3100)
Low MB - High Leverage quartile in 1928	-0.09***	-0.06*	-0.07**
	(0.0070)	(0.0680)	(0.0380)
Low-Mid MB - High Leverage quartile in 1928	-0.15***	-0.14***	-0.14***
	(0.0000)	(0.0000)	(0.0000)
High MB - High Leverage quartile in 1928	-0.09***	-0.08***	-0.08***
	(0.0020)	(0.0040)	(0.0060)
Low MB - Low Leverage quartile in 1928	0.07*	0.06	0.06
	(0.0970)	(0.1750)	(0.1310)
Low-Mid MB - Low Leverage quartile in 1928	0.04	0.03	0.04
	(0.1130)	(0.1560)	(0.1040)

TABLE 6, PANEL B - *Continued*

	(1)	(2)	(3)
High MB - Low Leverage quartile in 1928	-0.01	-0.02	-0.01
	(0.4310)	(0.3390)	(0.4680)
Low MB - High Leverage quartile in 1938		-0.08**	
		(0.0300)	
High MB - High Leverage quartile in 1938		-0.09*	
		(0.0990)	
Low MB - Low Leverage quartile in 1938		0.03	
		(0.1670)	
High MB - Low Leverage quartile in 1938		0.00	
		(0.8940)	
President change x Low MB - High Leverage in 1938			-0.03
			(0.4020)
President change x High MB - High Leverage in 1938			-0.10
			(0.2240)
President change x Low MB - Low Leverage in 1938			0.06**
			(0.0240)
President change x High MB - Low Leverage in 1938			-0.02
			(0.3700)
Age	0.02	0.02	0.02
	(0.2790)	(0.3330)	(0.3060)
Intercept	-0.10	-0.12	-0.11
	(0.2130)	(0.1460)	(0.1740)

Notes: This table provides the parameter estimates of the OLS regression of change in leverage between 1938 and 1948 on firm characteristics that reflect the firm's experience during the Depression and its status as of 1938. All variables except those specifically mentioned as being measured in 1928 are measured as of 1938. MB is the ratio of market equity to book equity. Volatility is the stock return volatility. Operating profit is earnings before interest and tax (EBIT) divided by total assets. Leverage is the ratio of total debt to total assets. Size is the log of the book value of a firm's total assets. Board size is the log of number of members on the board. Insiders is the fraction of insiders on the board. Age is the age of the firm in 1938. Distress dummy equals one for firms that became distressed by 1938 but reorganized as a new firm in the 1940s and equals zero otherwise. President (chairman) change dummy is 1 if the firm's president (chairman) changes during the period 1938 to 1948 and 0 otherwise. The firms are sorted into 16 groups based on their 1928 MB and Leverage quartiles. The 1928 quartile variables take the value 1 for a particular firm if the firm was in that quartile in 1928 and 0 otherwise. The firms are also sorted into 16 groups based on their 1938 MB and Leverage quartiles. The 1938 quartile variables take the value 1 for a particular firm if the firm was in that quartile in 1938 and 0 otherwise. President change x quartile variable is the interaction of the president change variable and the quartile variable. The coefficients are shown with the p-values obtained using robust standard errors, in parantheses. ***, **, * represent significance at 1, 5, and 10% respectively.

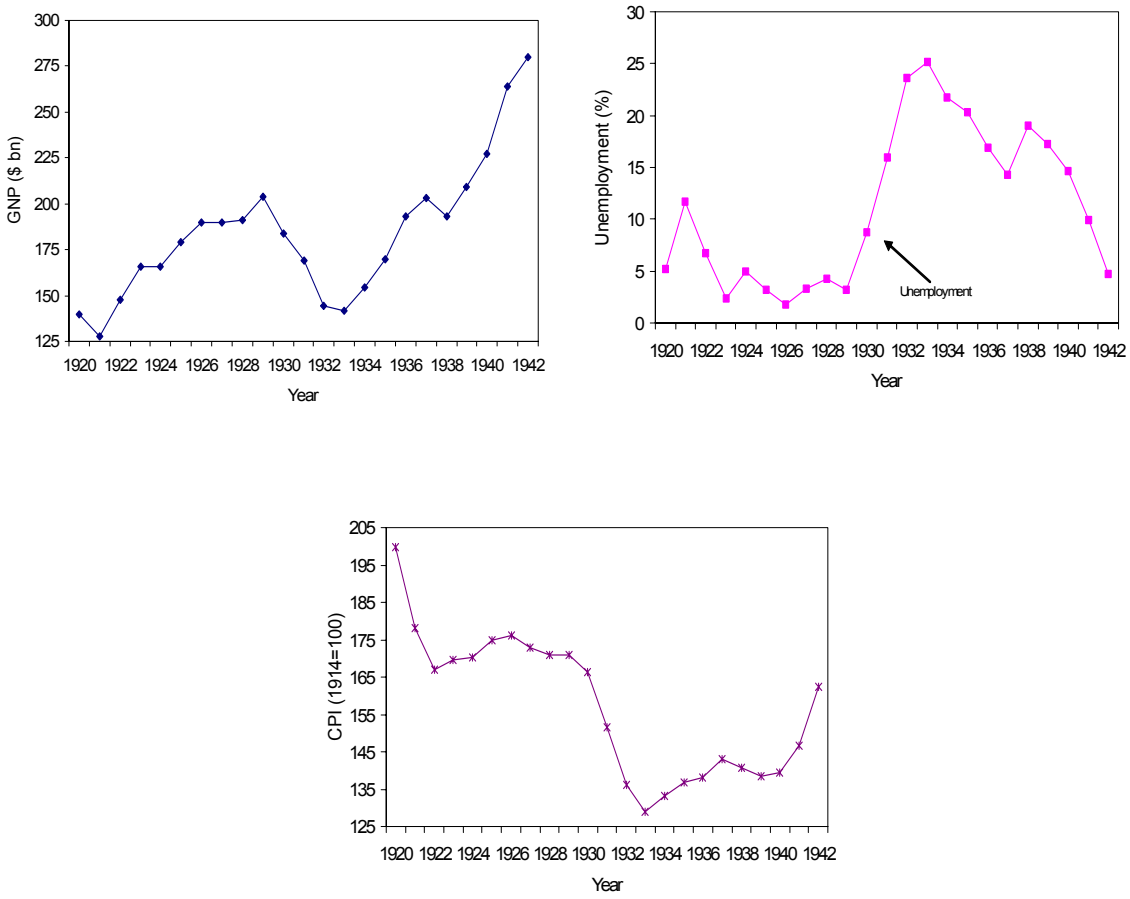

FIGURE 1 - EARNINGS GROWTH, EMPLOYMENT, AND INFLATION DURING THE GREAT DEPRESSION

Notes: Panel A shows that real GNP declined until 1933 and only reached 1928 levels again in 1938. Panel B shows that unemployment increased sharply starting in 1928, peaking at 25% in 1933-34. Panel C shows that deflation occurred during the 1920s and part of the 1930s.

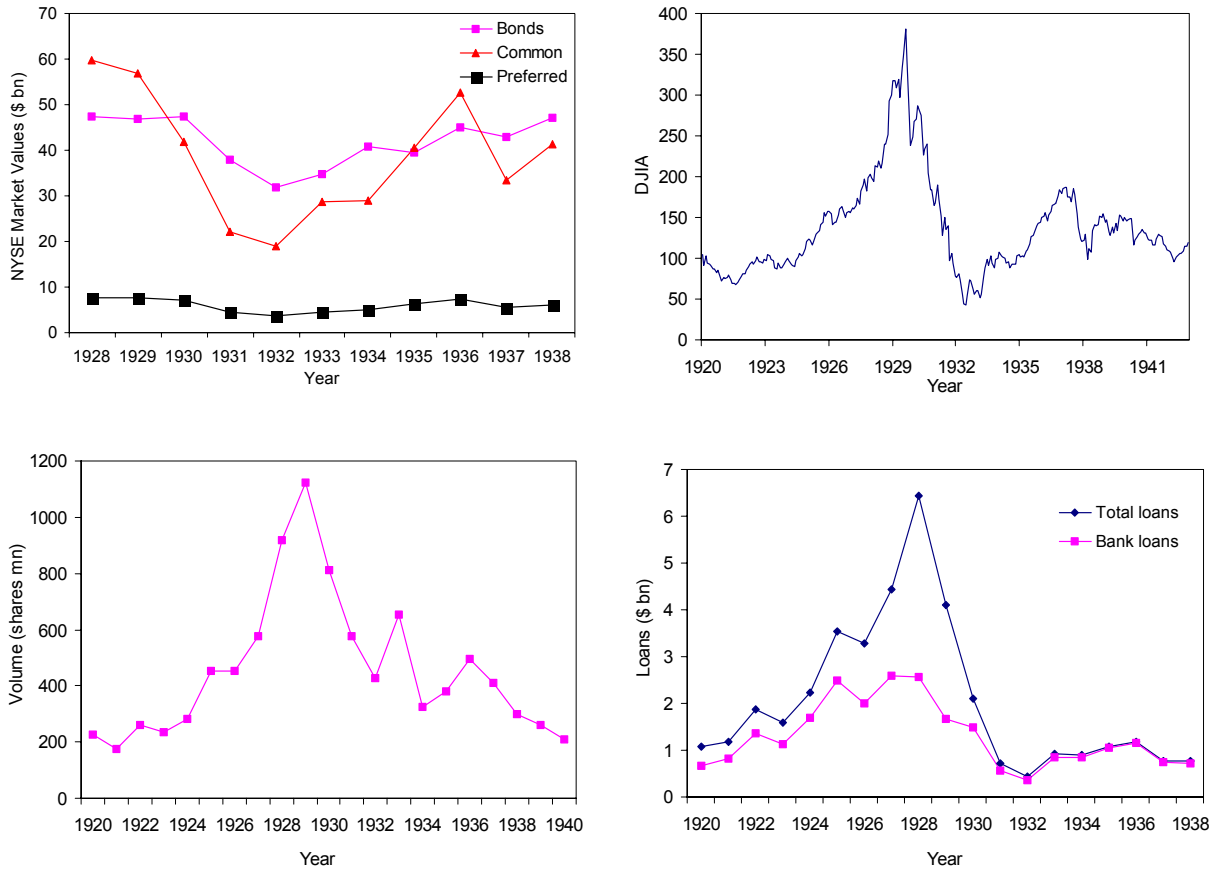

FIGURE 2 - STOCK MARKET BEHAVIOR DURING THE GREAT DEPRESSION

Notes: Panel A shows that the aggregate market value of NYSE securities declined. Panel B shows a decline in the Dow Jones Industrial Average. Panel C shows a reduction in the volume of shares traded during the Depression, while Panel D shows that the total loans to stock brokers declined.

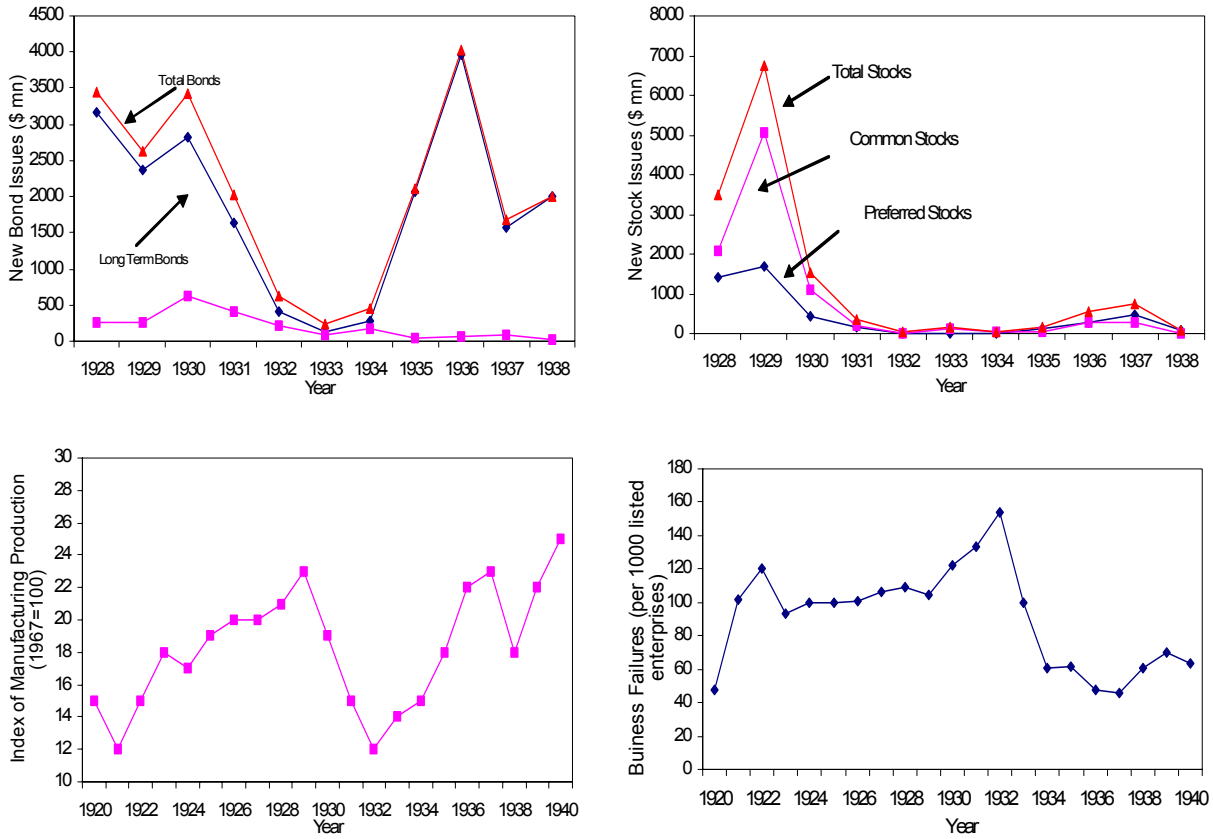

FIGURE 3 – IMPACT ON CORPORATE SECTOR

Notes: The corporate sector experienced a significant downturn during the Great Depression. Panel A shows us that total corporate borrowing fell sharply from 1929 to 1933, while Panel B shows that the funds raised through new stock issues also declined. Panel C shows that the index of manufacturing production declined sharply, while Panel D shows that business failures increased significantly from 1929 to 1932.

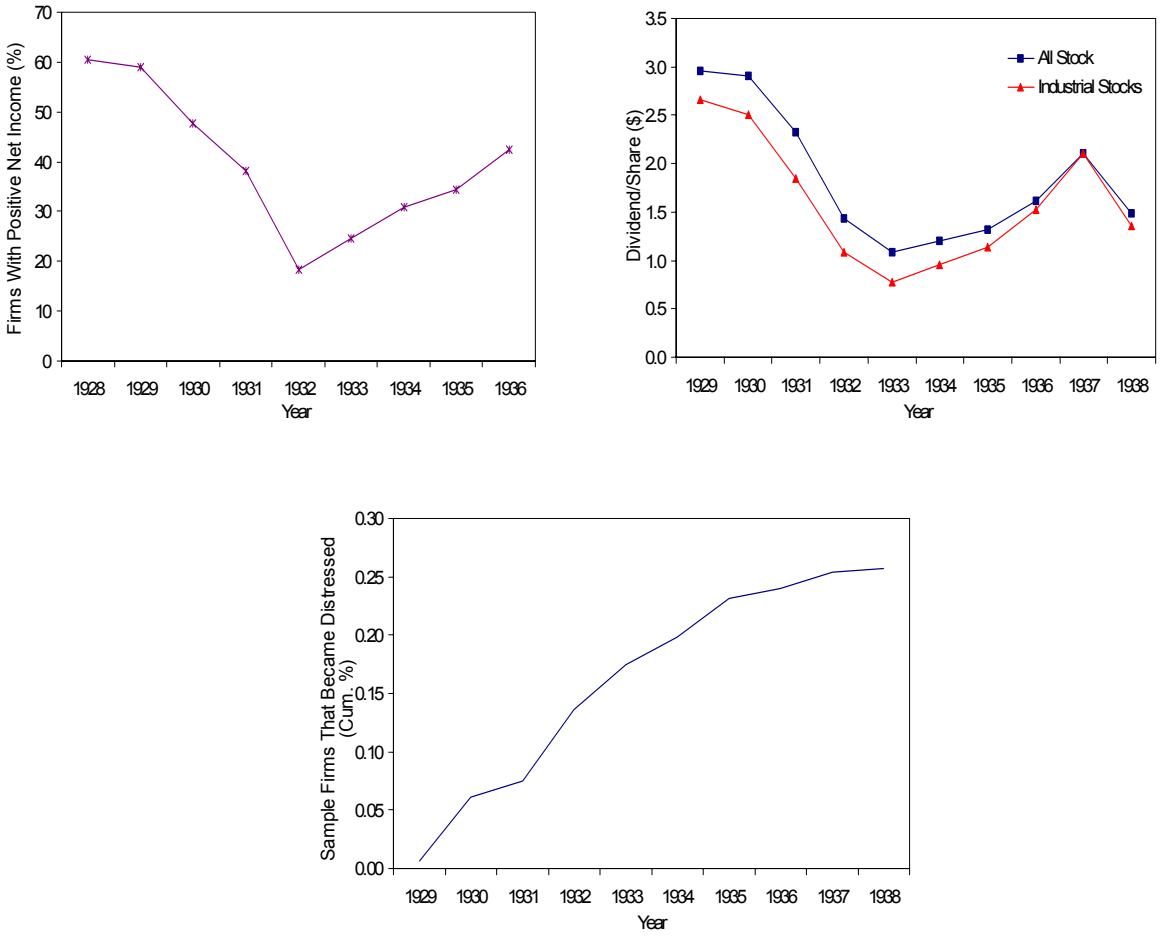

FIGURE 4 – INCOME, DISTRIBUTION, AND DISTRESS

Notes: Panel A shows that the percentage of firms with positive net income declined from about 61% in 1928 to about 18% in 1932. Panel B shows a decline in dividend per share during this period. Panel C shows the cumulative percentage of firms that became distressed in our sample (103 firms became distressed by 1938), where Distress is defined as liquidation, filing for bankruptcy, undertaking a court ordered reorganization, undertaking a recapitalization when the stock is listed as worthless, or being explicitly listed as being financially distressed.

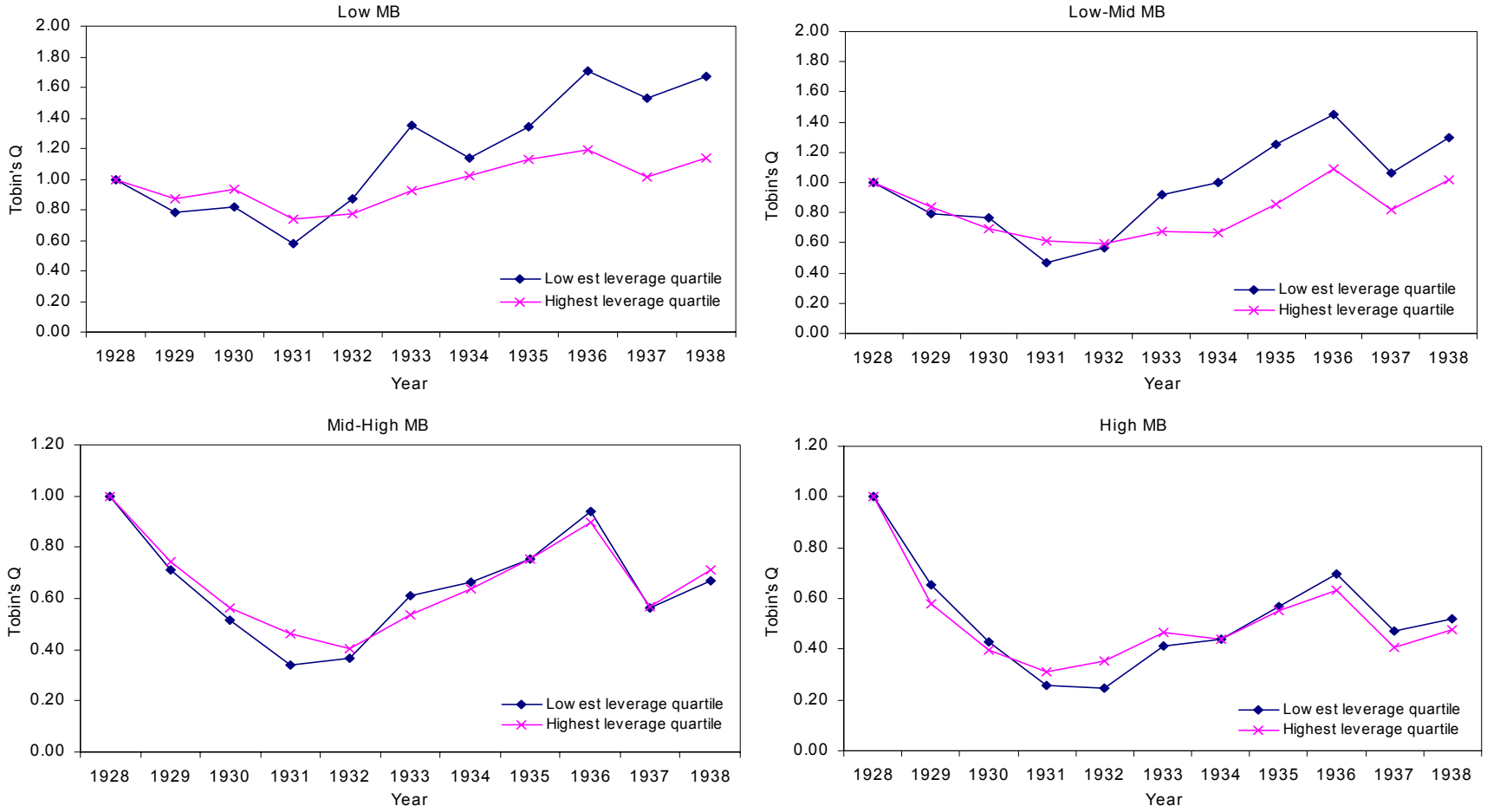

FIGURE 5, PANEL A: IMPACT OF DEBT ON MARKET VALUATION

Notes: Panel A shows the change in Tobin's q of the highest and lowest leverage quartiles, crossed with all four market to book quartiles. Each sort is unconditional. The impact of leverage was largest in value firms (low market to book) and smallest in growth firms (high market to book).

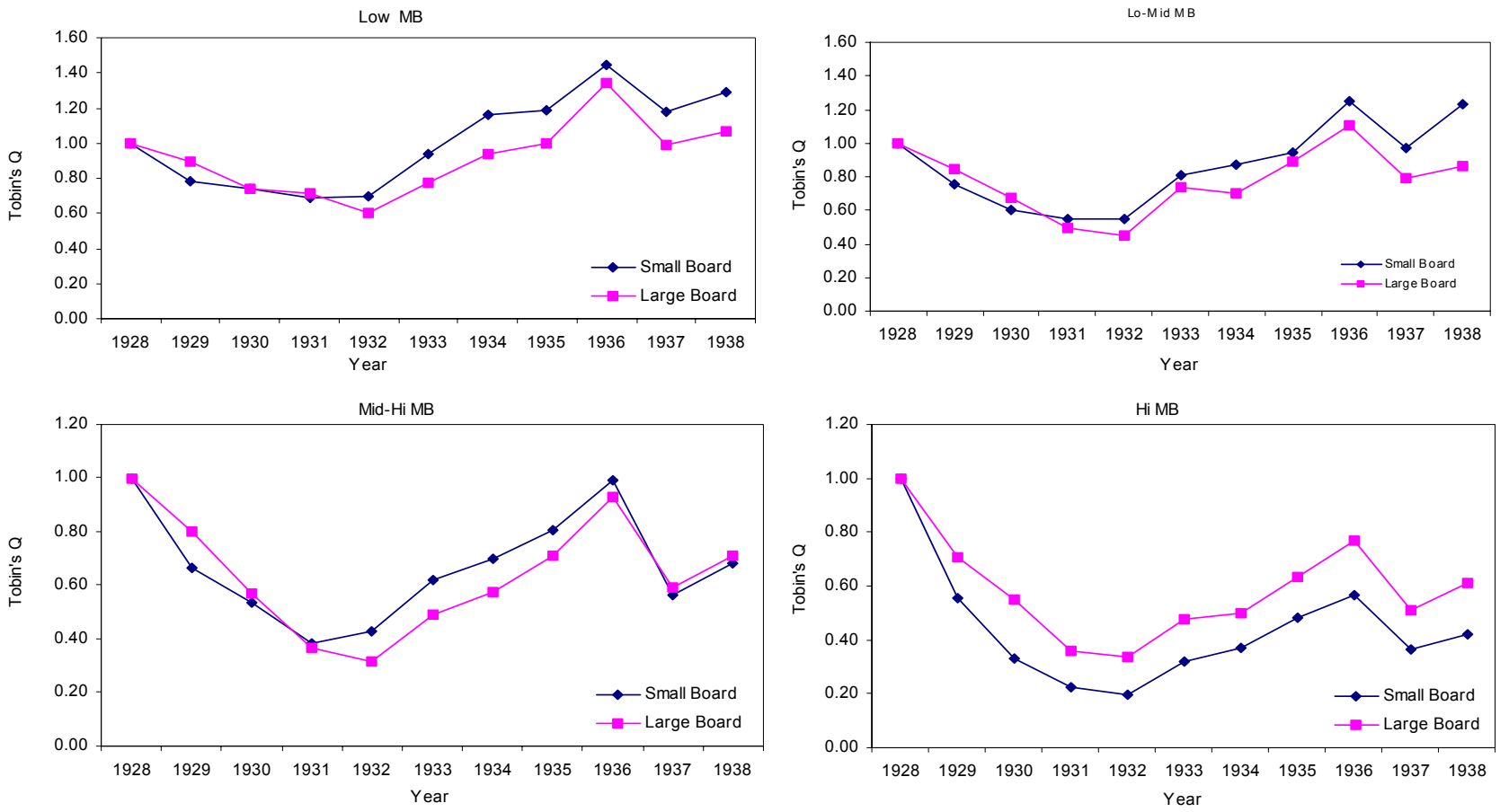

FIGURE 5, PANEL B: IMPACT OF BOARD SIZE ON MARKET VALUATION

Notes: Panel B shows the change in Tobin's Q of the highest and lowest board size quartiles, crossed with all four market to book quartiles. Each sort is unconditional. Larger boards hurt value firms (low market to book) and helped growth firms

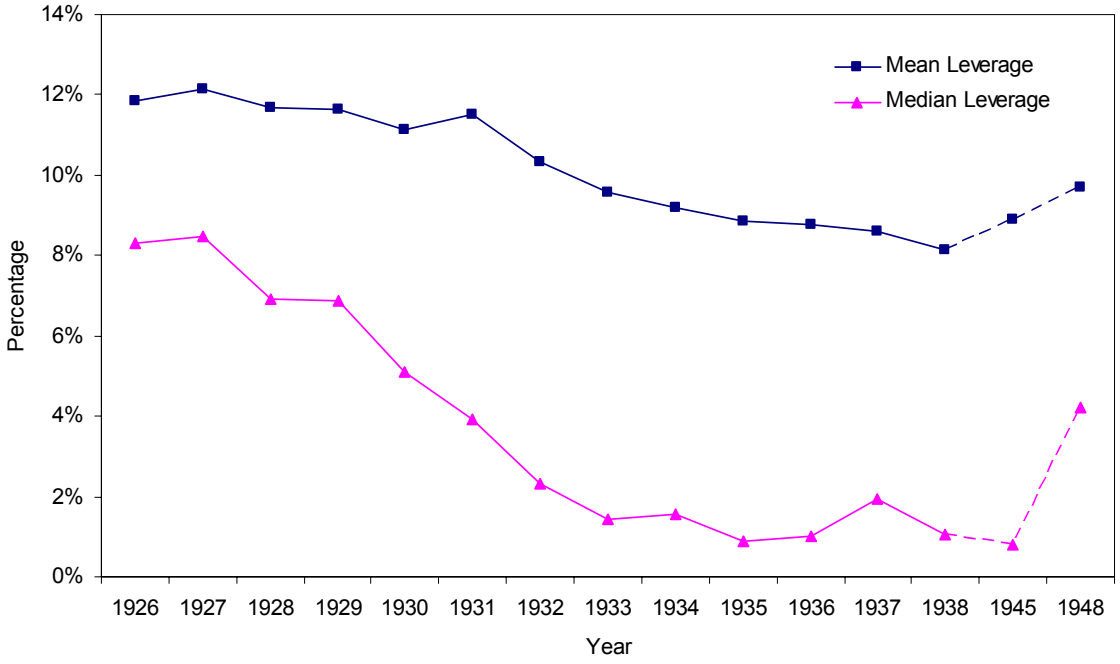

FIGURE 6 - MEAN AND MEDIAN LEVERAGE DURING THE DEPRESSION AND FOR 1945 AND 1948.

Notes: Leverage (i.e., debt to total assets ratio) decreased during the Depression and increased slowly after economic conditions improved significantly in the 1940s.